

DISEASES

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OF THE

CHEST

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Editorial Comment

OHIO AND WEST VIRGINIA STATES ISSUE

IN conformity with a policy which was started at the inception of this journal, one issue of

Diseases of the Chest, is devoted each year, to the presentation of a picture of sanatorium facilities, of the advances made in tuberculosis control in one state or in a group of states in this country.

In 1935, the August issue of *Diseases of the Chest*, was dedicated to the State of New Mexico. In 1936, the May issue of *Diseases of the Chest*, was dedicated to the State of Missouri. In 1937, the June issue of *Diseases of the Chest*, was dedicated to the States of North Carolina, South Carolina, Virginia, Georgia, and Florida; and it was known as the *South Atlantic States Issue*. In 1938, the June Issue of *Diseases of the Chest*, was dedicated to the States of California, Oregon, and Washington; and it was known as the *Pacific Coast States Issue*. In 1939, the October Issue of *Diseases of the Chest*, was dedicated to the States of Illinois, Indiana, Iowa, and Wisconsin; and it was known as the *Mississippi Valley States Issue*.

This year, it is our privilege and pleasure to dedicate this Issue of *Diseases of the Chest*, to the States of Ohio and West Virginia; and the issue is to be known as the *Ohio and West Virginia States Issue*.

Each of the states represented in this issue of the journal has contributed scientific papers, dealing with subjects related to chest diseases, and written by physicians who are closely identified with the treatment of chest diseases in those states.

Each of these states has presented a picture through the printed word and by illustration, showing the present facilities for the treatment of the tuberculous within those states.

This issue of the Journal also carries the pictures and the biographies of physicians in the States of Ohio and West Virginia; who have pioneered in tuberculosis work in their respective states. We pay tribute to these pioneers of medicine, and only regret that we do not have the space available to include the biographies of many more of the eminent physicians who have been pioneers in this great cause.

The Editorial Board of *Diseases of the Chest*, expresses its appreciation to the State Committees under whose direction this issue of *Diseases of the Chest* was compiled, and also to the officials of sanatoria, tuberculosis societies, and to all of the other individuals and agencies that cooperated to make this issue of *Diseases of the Chest* possible.

—F. W. B.

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LOUIS MARK, M.D.
1892 -

Dr. Louis Mark was born at Duluth, Minnesota, December 12, 1892. He was graduated from the Ironwood Michigan High School and enrolled in the Marquette University, Milwaukee, Wisconsin, where he was graduated with a degree of Doctor of Medicine in 1915. He interned in the Cincinnati General Hospital for one year, and in the summer of 1916 assisted in research work at the University of Wisconsin with Dr. Kennon Dunham and Dr. William Snow Miller. He entered private practice in Washburn, Wisconsin, where he remained until the World War, and then went to Cincinnati where he was associated with Dr. Kennon Dunham. During the War he was contract surgeon, doing chest examining for the Advisory Board. At the end of 1918

and the early part of 1919 he was resident physician at the Ohio State Sanatorium. On July 1, 1919 he purchased the Rocky Glenn Sanatorium for tuberculosis at McConnelsville, which he has conducted ever since. During these 21 years the institution has increased from a capacity of less than 20 beds to a capacity of 150 beds at present.

Following the World War he was chest expert for the Veteran's Bureau from 1919 to 1923. In 1921 he moved his office to Columbus, Ohio, where he has practiced since, and has limited his practice to diseases of the chest. He has been a leader in the medical development and the healing of tuberculosis throughout the state of Ohio, and has taken an active part in the establishment and the development of chest clinics throughout the state. He has written many articles on the problems of tuberculosis both in relation to diagnosis and treatment.

In 1928 he was appointed Chief of the Chest Department at White Cross Hospital, Columbus, Ohio. In 1934 he started the J. M. Case Tuberculosis Sanatorium at Delaware, Ohio, and has been its Medical Director since.

At the present time, he is Medical Director of the Rocky Glenn Sanatorium at McConnelsville, Ohio; Medical Director of the J. M. Case Tuberculosis Sanatorium at Delaware, Ohio; Chief of the Chest Department at White Cross Hospital, Columbus, Ohio; and Advisor of Tuberculosis Work to several labor organizations.

He was married in 1919, and has three children, Charlotte, age 20, and Louise and Lloyd, twins, age 16. He is a great believer in hobbies. He has played golf a great deal, and has been Club Champion for many years. He is also a very ardent bridge player, and is one of the Directors of the American Contract Bridge League. He loves to take moving pictures, takes his camera wherever he goes, and has a large collection of fine movies by which to remember all past experiences. He has been a fellow of the American College of Physicians since 1926, and was one of the charter members of the American College of Chest Physicians.

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A Brief Summary of the Tuberculosis Campaign in Ohio*

The Campaign against tuberculosis in Ohio begins officially with the publication by the State Board of Health of the popular educational circular entitled "The Prevention of Consumption" in 1894.

In 1897, the board of health of the city of Cincinnati passed a regulation which declared tuberculosis a reportable disease. This is the first official pronouncement on the subject in Ohio so far as can be ascertained. The board of health went one step further when it set apart a building in its contagious disease hospital group for the care and treatment of cases of tuberculosis. This was done on July 8, 1897. It was the first municipal hospital for the consumptive poor in the United States.¹

The next year, 1898, the State Board of Health sent instructions to the superintendents of public institutions concerning the disease and the offer of laboratory service in the examination of sputum. This laboratory service has grown with the years and continues to be one of our important aids in diagnosis.

On November 14, 1901 the Ohio Society for the Prevention of Tuberculosis was organized. This Society followed the pattern of the Pennsylvania Society for the Prevention of Tuberculosis founded by Dr. Flick in 1892. The Ohio Society was thus the second state organization established in the United States. It was incorporated October 24, 1911 and reorganized as the Ohio Public Health Association on May 13, 1920.

An act was passed by the General Assembly of Ohio on April 23, 1902 which provided for the appointment of a commission to investigate the feasibility of erecting sanatoria for tuberculosis patients in Ohio. The results of this first step was the dedication of the Ohio State Sanatorium at Mt. Vernon on October 27, 1909. Today, the institution has 258 beds available for cases of incipient pulmonary tuberculosis.

The first tuberculosis dispensary in Ohio was opened by the Medical College of Western Reserve University, Cleveland, on October 6, 1904. The medical director was John H. Lowman, M.D.

In the meantime, the first local organization with a continuous record was organized, the Anti-

Tuberculosis League of Cleveland. This took place on March 3, 1905. Today there are 88 county-wide associations covering every county in the state.

On April 2, 1908 the General Assembly passed an act authorizing boards of County Commissioners to construct suitable buildings for the care of tuberculosis patients to be known as a county hospital for tuberculosis. Under this act, Franklin County opened the first institution in the state on January 8, 1909. In 1909 the county law was amended to provide that from two to five counties could join in establishing a district for the erection and maintenance of a district tuberculosis hospital. Today there are 16 county hospitals with a total bed capacity of 2,111; 3 district tuberculosis hospitals with total bed capacity of 369; 5 private tuberculosis hospitals with a total bed capacity of 441; public institutions with separate provision for tuberculosis cases with total beds of 993; 2 federal hospitals with total bed capacity of 250 and 1 state institution with provision for 257 beds, making the total bed capacity in Ohio 4367.

The first state-wide vital statistics law was not enacted until May 5, 1908. Mortality statistics of tuberculosis began to assume validity in 1909. The death rate in that year was 143.7 per 100,000 population—the number of deaths being 6,844. In 1939 the record shows 2,946 deaths with a rate of 39.21 per 100,000 population.

In 1910 the first state-wide Christmas Seal Sale was conducted to finance the Ohio Society for the Prevention of Tuberculosis. As a result, the Society employed its first full-time paid executive secretary. This method of finance has continued to the present day, having grown from a total of \$37,235.27 in the state to \$312,652.91 in 1939.

The first survey of the tuberculosis situation in the state was made in 1911 and published by the Ohio State Board of Health in 1912. Employment of the first tuberculosis nurse occurred on March 4, 1912 by the Ohio Society for the Prevention of Tuberculosis. This was the beginning of the present system of public health nurses in the state.

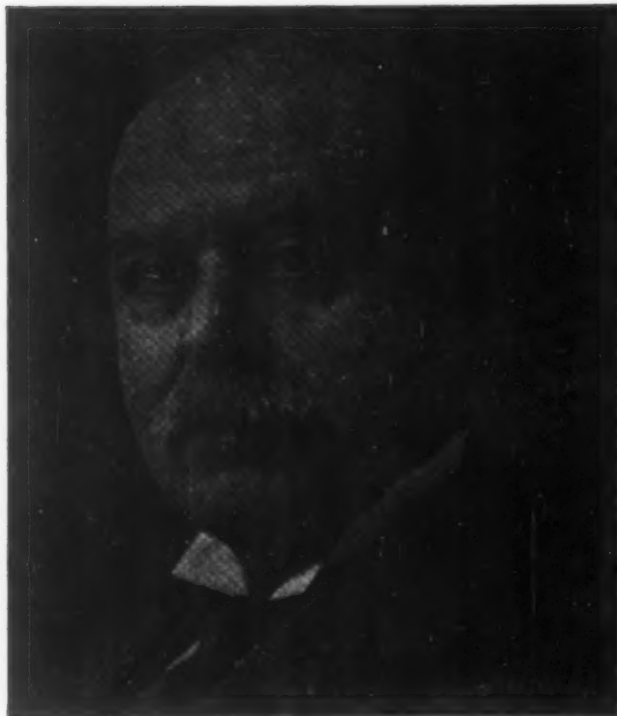
At a meeting of the State Board of Health on August 15, 1912, tuberculosis was added to the list of reportable diseases.

On May 15, 1913, the first division of tuberculosis in a health department in the United States (Continued to page 376)

* Published by the Ohio Public Health Association, Columbus, Ohio, June 1926, pp. 109.

¹ A History of the National Tuberculosis Association, Knopf, 1922, p. 11.

Tuberculosis Pioneers in Ohio



JOHN H. LOWMAN, M.D.
1849 - 1919

In Cleveland and, to a large extent, in Ohio, the great public interest shown in the control of tuberculosis and the great efforts made by the medical profession and health agencies to establish this control are monuments to Dr. John S. Lowman.

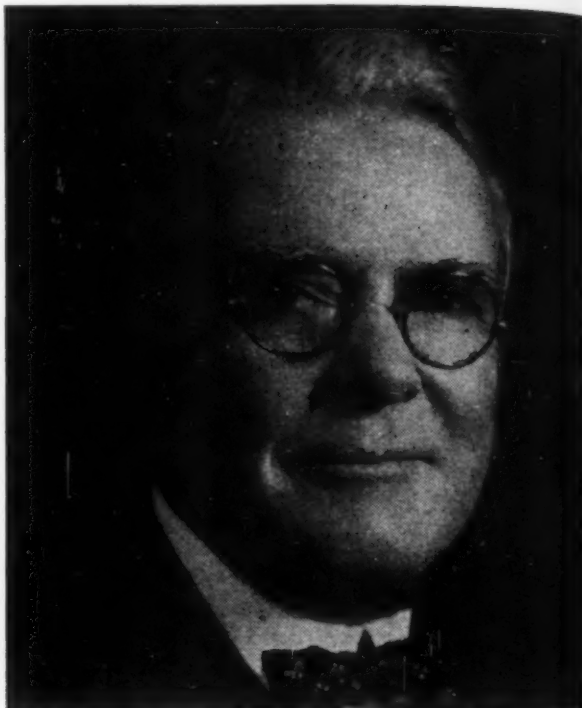
Almost single-handed he set in motion the influences and created the agencies and institutions that have pushed Cleveland to the forefront in the tuberculosis crusade. Among his accomplishments were the founding of the Anti-Tuberculosis League of Cleveland and Cuyahoga County, the Ohio Public Health Association, first free diagnostic clinics, family prophylactic clinics, the adoption of legislation making tuberculosis a reportable disease in Cleveland, establishment of a bureau of tuberculosis in the Cleveland Division of Health, opening of Sunny Acres Sanatorium, and conducting the original tuberculosis educational campaign in Ohio.

For 42 years Dr. Lowman was a professor at the School of Medicine of Western Reserve University. In 1877 he was named Professor of Materia Medica and Therapeutics, and in 1889 he was appointed Professor of Medicine. In 1919 he relinquished the Professorship of Medicine and until his death the same year he occupied the chair of clinical medicine.

It was in 1902 that Dr. Lowman began to study the control of tuberculosis despite his labors in institutional medical education and an enormous private practice. He visited the outstanding tuberculosis sanatoria and institutions of France and Germany. Dr. Lowman became a prominent figure at the international congresses on tuberculosis. During 1913-14 he served as president of the National Tuberculosis Association.

Dr. Lowman found time among his crowded hours to lecture before labor unions, schools, church societies, settlements and other groups. Endowed with a gracious personality and aided by a striking earnestness and speaking ability,

(Continued to page 379)



CHARLES OLIVER PROBST, M.D.
1857 - 1933

Delving into the origins of the fight against tuberculosis in Ohio, one is impressed with the perspicacity and pertinacity of Dr. Charles Oliver Probst—the true pioneer in the movement in the state.

Born December 4, 1857 in Middleport, Ohio, on the Ohio River, Dr. Probst after attending local schools entered Miami Medical College, Cincinnati, on October 1, 1879 and graduated February 27, 1882, receiving his M.D. degree. In July of that year he was appointed pharmacist at the State Hospital for the Insane at Athens. In 1885 he moved to Columbus, Ohio where he opened an office for the practice of medicine.

On July 28, 1886, he was elected secretary of the Ohio State Board of Health. The law creating this new agency had just been passed by the General Assembly of Ohio in the preceding April. In reality, Dr. Probst was the first administrative head of the public health work in the state. He was then 29 years of age.

From his first appointment, until his resignation twenty-five years later, Dr. Probst developed a wide interest in the many facets which go to make up the public health program of a state. Not the least of these interests was an attack on tuberculosis—the outstanding leader in the causes of death not only in Ohio but the nation as well.

Examination of the record reveals Dr. Probst presenting a proposal to the State Board of Health as early as June 19, 1889, to issue a popular pamphlet on the prevention of pulmonary consumption. Authority was given the president and secretary of the Board to prepare such a circular. However, nothing was done at this time.

Finally, in 1894, Dr. Probst circularized the profession of the entire state to find out what the prevailing opinion was concerning the prevention of the disease. The outcome of this query enabled him to report to the State Board of Health "These reports afford the most convincing evidence that

(Continued to page 376)

Tuberculosis Pioneers in Ohio



H. KENNON DUNHAM, M.D.
1872 -

Dr. Dunham was born on March 3, 1872 in Fairview, Ohio. He received his M.D. degree from the University of Cincinnati in 1894 and then took post-graduate work at Johns Hopkins Hospital. He followed this with research work at the same place, demonstrating specific roentgen markings characteristic of pulmonary tuberculosis.

In 1904 he returned to the University of Cincinnati as Professor of Electro-therapeutics. In the course of time, Dr. Dunham assumed other positions at the University: Director of the Tuberculosis Clinic, Head of the Department of Tuberculosis, Associate Professor of Medicine, and Director of Tuberculosis Service for the Cincinnati General Hospital.

Dr. H. Kennon Dunham has been one of the early pioneers in demonstrating the value of x-ray findings in the diagnosis of tuberculosis. Many students came from various parts of the world to study under Dr. Dunham. He has contributed much to the medical literature and his writings have been widely circulated.

He is at present engaged in the private practice of chest diseases at Cincinnati.

Dr. Dunham is a past president of the Cincinnati Anti-Tuberculosis League, a past president of the Ohio Public Health Association, and a past president of the National Tuberculosis Association.



JOSEPH CHARLES PLACAK, M.D.
1882 -

Pioneer in tuberculosis work in the City of Cleveland is Dr. Joseph Charles Placak, who was born in Cleveland on February 22, 1882. He graduated from the College of Physicians and Surgeons of Western Reserve University in 1903 and did post-graduate work in the University of Prague, Austria.

He became resident pathologist of Cleveland City Hospital and later resident physician for a period of four years. In 1906, he was made the Medical Superintendent of the Municipal Tuberculosis Sanatorium for the city of Cleveland at Warrensville, Ohio, the first to hold this position. He has been head of the Division of Tuberculosis, Cleveland City Hospital since 1915. During the World War, he was a Major in the Medical Corps of the army and Chief of Medical Service, Evacuation Hospital No. 6, at Coblenz, Germany.

At present, Dr. Placak is a member of the American Board of Internal Medicine; American College of Physicians; Board of Directors of the National Tuberculosis Association; Member of the Board of Regents of the American College of Chest Physicians; President of the Anti-Tuberculosis League of Cleveland and Cuyahoga County; Chief of Staff of Mount Royal Sanatorium for Tuberculosis; Consulting Physician at Lake County Memorial Hospital. Dr. Placak has also written numerous articles on chest diseases and public health.

SEVENTH ANNUAL MEETING, AMERICAN COLLEGE OF CHEST PHYSICIANS
Cleveland, Ohio, June 1-3, 1941

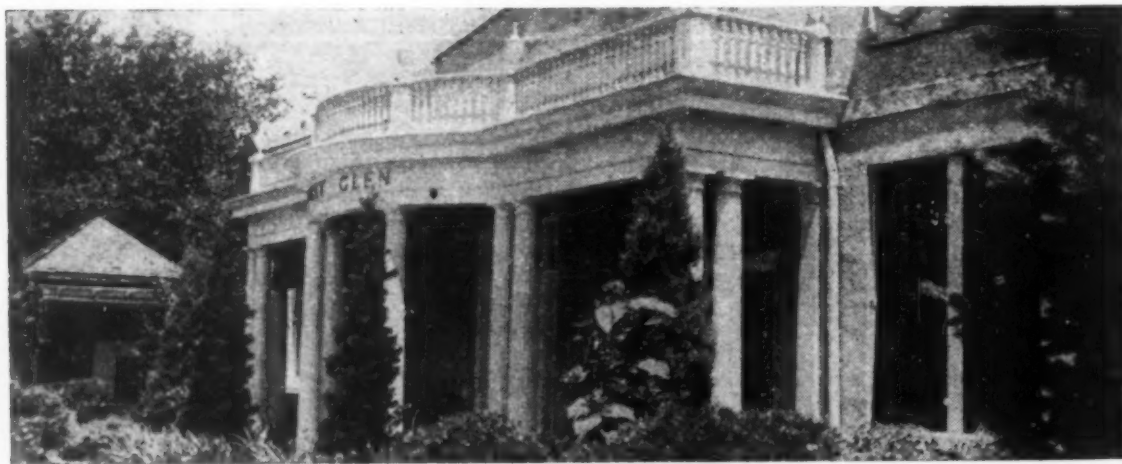
Tuberculosis Pioneers in Ohio



HARRY A. PHILLIPS
1886 - 1940

Ohio lost one of her most indefatigable workers in tuberculosis with the death of Harry A. Phillips on October 5, 1940. Harry Phillips entered the tuberculosis field in 1910, when he himself developed the disease and entered Mt. Vernon Sanatorium. As his health improved, he took a secretarial position in the office of the Superintendent, Dr. Douglass, which position led to active management of the entire institution, when Dr. Douglass was called to Italy for an International Tuberculosis Conference.

It was at Mt. Vernon that Harry Phillips met Dr. Louis Mark. Out of the warm friendship that flourished between the two men, came Harry Phillips' next forward step in tuberculosis work. For when Dr. Mark purchased Rocky Glen Sanatorium twenty years ago, Harry Phillips was installed as Manager. He held that position until his death. And the fruit of his twenty years of labor is embodied in the sanatorium, which rose from a small, unknown institution to one of the finest private sanatoria in the United States. Truly, Harry Phillips needs no memorial stone. Rocky Glen Sanatorium is a living monument to his energy, his business acumen, his passionate desire to build for the tuberculous sick a suitable haven, a place where men could be revived and sent back to the world once again whole. Rocky Glen is the phoenix, rising from the ashes of Harry Phillips' earlier weariness of body and spirit. For we, who knew him, Harry Phillips is not dead. We have only to look at Rocky Glen to know that he will live on this earth until the buildings crumble to dust.



ROCKY GLENN SANATORIUM

McCONNELSVILLE, OHIO

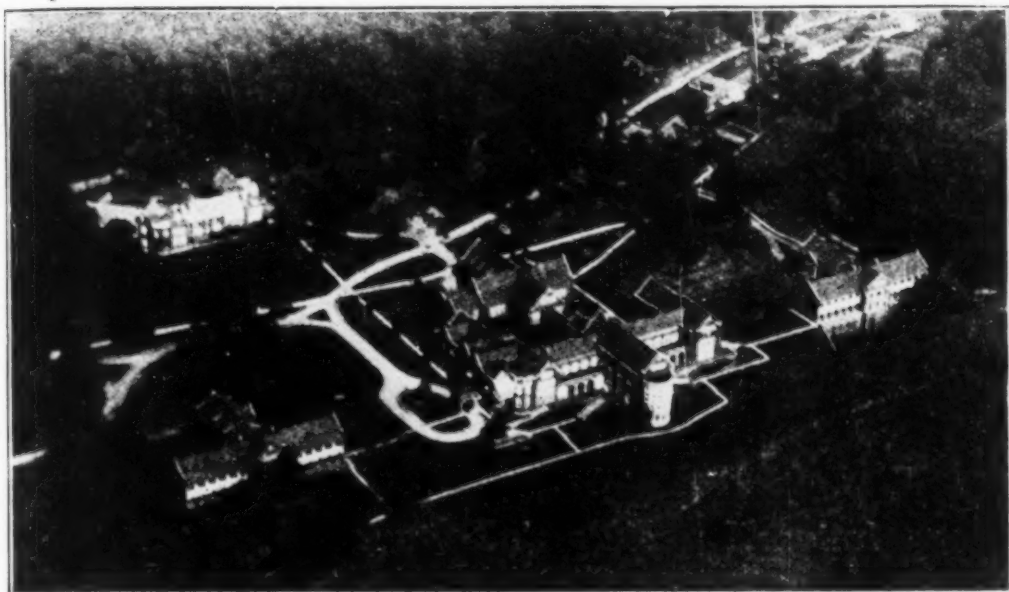
The Rocky Glenn Sanatorium was established by Dr. Clyde Leeper in 1911, as a private institution for the care of tuberculosis patients. In 1915, the institution was taken over by Dr. Hill, who continued to operate it until 1919. The capacity was very small and the institution was of the cottage-plan type. Dr. Louis Mark purchased the institution in 1919 and has continued to conduct it since that time, and it has since been enlarged to 150 beds.

In 1921, Harry Phillips became superintendent and he remained in this capacity until his death on

October 5, 1940. It was through his untiring efforts that this institution was built to its present capacity.

The institution remains as a private institution of cottage-plan type, with all forms of tuberculosis being cared for. The institution is beautifully laid out and the grounds are very restful. Both medical and surgical facilities are available, and a complete operating set-up for all types of tuberculosis is in the main building. The institution boasts of a very fine record and has operated to capacity through all of the years.

Ohio Sanatoria



OHIO STATE SANATORIUM MOUNT VERNON, OHIO

The Ohio State Board of Health, of which Dr. C. O. Probst was secretary, organized in 1901, the Ohio Society for Prevention of Tuberculosis. About two years later, Dr. Probst requested the Governor of Ohio to appoint a Commission to investigate the advisability of providing a State Tuberculosis Sanatorium in Ohio. This became an act on April 23, 1902. Dr. Probst became secretary of that Commission. In April 1904, the general assembly passed an act to provide for the appointment of a committee to select and purchase lands and erect necessary buildings for the State Sanatorium, confined to the care of incipient pulmonary tuberculosis. Dr. Probst became secretary of this committee and most of the ultimate results in a medical way which needed foresight were sponsored

through the recommendations of Dr. Probst.

The Ohio State Sanatorium was dedicated on October 27, 1909, with a capacity of one hundred and twenty patients, built on the cottage-plan. The tract consists of three hundred and fifty-five acres of rolling land and a virgin forest located three miles northeast of Mt. Vernon. Dr. C. B. Conwell of Cincinnati, Ohio, was the first Superintendent, who served until his ill-health demanded his resignation in 1911. He was succeeded by Dr. Stephen A. Douglas of Mansfield, Ohio, who served until 1920 and was succeeded by Dr. F. C. Anderson of Cambridge, Ohio, who is the present superintendent. The present capacity of the Sanatorium is two hundred and forty beds.



THE AVALON SANATORIUM MOUNT VERNON, OHIO

The Avalon Sanatorium, located on the outskirts of Academia, about two miles from Mt. Vernon, Ohio, was founded by C. R. Dotson in 1932, and rapidly developed from a private home to an institution with facilities for caring for 105 bed cases of tuberculosis.

There are eight buildings for patients, with rooms very pleasantly located, each with a three side exposure, giving a maximum of light, air and sunshine. There are also a nurses' dining room, help's dining room, an administration building, a newly equipped kitchen, a laundry and a pasteurizing plant.

The medical and surgical equipment is practical and up-to-date, and there are facilities for doing all necessary work, with a medical staff thoroughly ef-

ficient and capable of carrying out any work of this kind.

The Avalon Sanatorium is patronized by both county and private patients, also the state tuberculosis patients from Fort Hayes. This Institution is known over the United States, and patients have come from as far west as Utah.

Surroundings and treatment, which are like those of a private home, do much to keep the inmates cheerful and happy. This attitude of mind is a necessary asset in the cure of tuberculosis, and is the fundamental reason that nearly 75 per cent of the patients who enter Avalon are able to leave and resume their regular life.

Ohio Sanatoria



EUCLID - MENTOR SANATORIUM MENTOR, OHIO

Established four years ago, Euclid-Mentor Sanatorium has been a real home for tuberculosis patients, who gain rapidly in the pleasant and comfortable surroundings and where the most scientific and modern equipment is combined with excellent medical and nursing care.

The sanatorium is privately owned and is situated on U. S. Route No. 20, 23 miles from the center of Cleveland, Ohio. There are thirty-five acres of land on which are vegetable gardens, orchards, flower gardens and spacious lawns. There is pure spring water and only the highest quality of food is served. Patient's appetite whims are favored so far as is consistent with sound medical treatment.

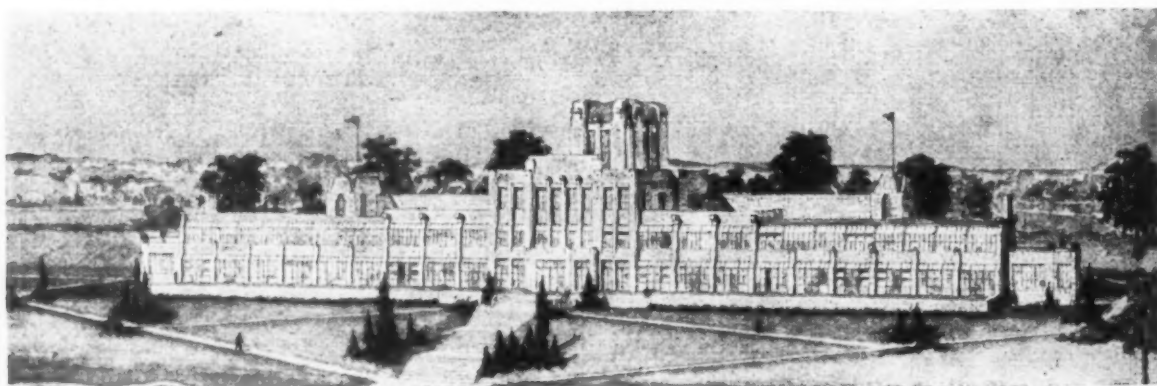
Euclid-Mentor Sanatorium has been given the high-

est rating as a fine tuberculosis hospital. The medical department is under the direction of Dr. J. C. Placak, Jr. Registered nurses are constantly in attendance.

Equipment in private rooms and wards includes excellent hospital beds, inner spring mattresses, Kenwood blankets and the necessary bedside equipment.

Restricted to thirty-five beds, in order to allow more individual care, Euclid-Mentor is an ideal sanatorium where instruction in the way of living after leaving the hospital is given much attention. The rates, \$21.00 to \$40.00 per week, include medical and nursing service, x-ray, pneumothorax and laboratory fees.

For information and reservations write Joy Mansfield, 1014 Republic Bldg., Cleveland, or Euclid-Mentor Sanatorium, Mentor, Ohio.



PLEASANT VIEW SANATORIUM AMHERST, OHIO

Pleasant View Sanatorium, the Lorain County Sanatorium for the care of tuberculosis, opened its doors to the first patients in December 1931. The Sanatorium consists of three modern buildings of local sandstone, located in a beautifully landscaped setting on North Ridge Road one mile east of Amherst. It is located at approximately equal distances from the two larger centers of population, Lorain and Elyria.

The main sanatorium building is modern, convenient and well equipped. There are quarters for 84 patients in two wings. There are private rooms and double rooms, all of which face away from the road to a terraced open park which contains a small lake.

The childrens' building, situated immediately to the east of the main building, has accommodations for 12

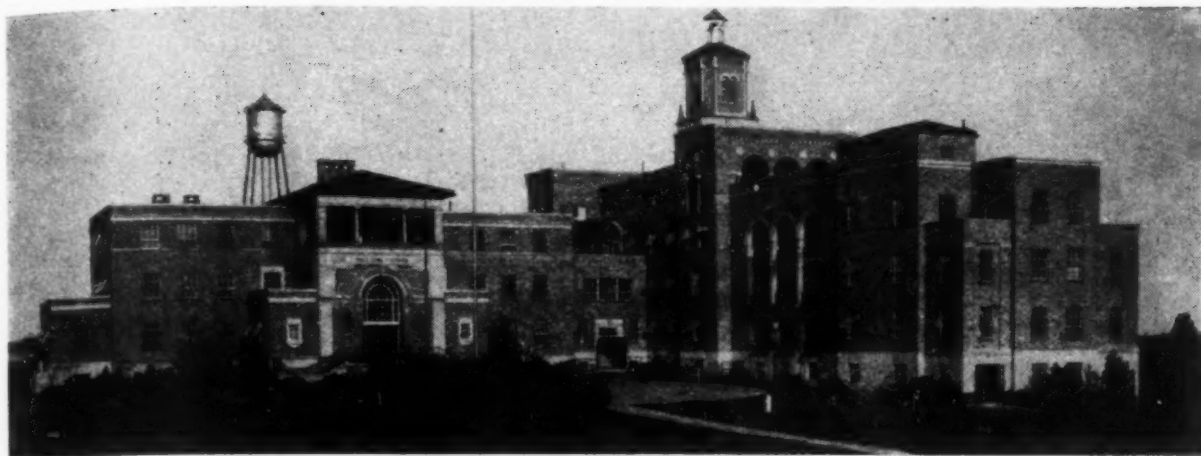
children, including a play room and a school room. A full-time teacher is employed.

The Sanatorium is governed by a board of three trustees who are appointed by the county commissioners, Mr. Dunn, Mr. Davidson, and Mr. DeChant, and to whom they are responsible. There are 43 employees under the supervision of Dr. D. H. Minnis, Superintendent; Mr. G. L. Slater, Business Manager; and Miss G. Lahiff, Supervisor of Nurses.

The Sanatorium Staff in addition to caring for the patients in the Sanatorium conduct three clinics per week for outside patients.

Admission to the Sanatorium is limited to residents of Lorain County.

Ohio Sanatoria



MOLLY STARK SANATORIUM CANTON, OHIO

The Molly Stark Sanatorium, located on route 62, half way between Canton and Alliance, was constructed by a building commission appointed by the Board of Commissioners of Stark County. The cost was nearly one million dollars. It is situated on a tract of 40 acres, and includes five buildings. The main structure has a capacity for 128 patients. It contains offices, medical facilities, x-ray and operating rooms. It also provides kitchen and service rooms. A children's cottage accommodates 38. A nurses' home is provided, as well as a cottage for the superintendent. A laundry is incorporated in the central heating plant.

The medical staff consists of the superintendent and one resident physician. A consulting staff of local physicians provides for general and orthopaedic surgery, eye, ear, nose and throat, and other medical advice. Specialists in genito-urinary conditions, dermatology, and proctology are available. A dentist is employed. All surgical procedures needed are performed at the institution. All types of tuberculosis are received.

A Board of Trustees appointed by the County Commissioners has charge of the institution and the spending of the funds appropriated by them.



MT. LOGAN SANATORIUM CHILLICOTHE, OHIO

The Mt. Logan Sanatorium is a district tuberculosis hospital organized in 1916 under the laws of the State of Ohio by the counties of Fayette, Highland, Jackson, Pike, Ross, and Scioto, and opened for admission of patients in July 1918.

Authority to operate is vested in a board of trustees, one member from each county, appointed by the respective boards of county commissioners. Mr. J. J. Butler, Hillsboro, Ohio, Chairman; Miss Vesta E. Yapple, Chillicothe, Ohio, Secretary; Dr. Louis H. Senteff, Chillicothe, Ohio, is the Resident Medical Superintendent.

The Sanatorium is situated about one mile west

of the court house, on an elevation three hundred feet above the Scioto River valley, facing Mt. Logan to the east, a setting to inspire the idea for the Great Seal of Ohio.

Number of beds in the beginning were 24; present capacity, 64. Average daily census during 1939, was 62. Seventy per cent of resident patients receive pneumothorax treatments, and a growing number (35) of former sanatorium patients return for refills.

Through cooperation with the Department of Research Surgery, Ohio State University, all the latest advances in chest surgery are available to our patients.

Ohio Sanatoria



HAMILTON COUNTY TUBERCULOSIS HOSPITAL CINCINNATI, OHIO

The Hamilton County Tuberculosis Hospital had its origin when the City of Cincinnati purchased the Guerley Farm in Greene Township on one of the hills to the west of the city in 1879. The original purpose of the purchase of this property was for the establishment of an isolation hospital for the care and treatment of small pox.

In 1897, fifteen tuberculosis patients, who up to this time had been cared for at the Cincinnati Hospital, were transferred to the renovated and improved "Branch Hospital for Consumptives." Thus was established the first municipally owned tuberculosis sanatorium in the country.

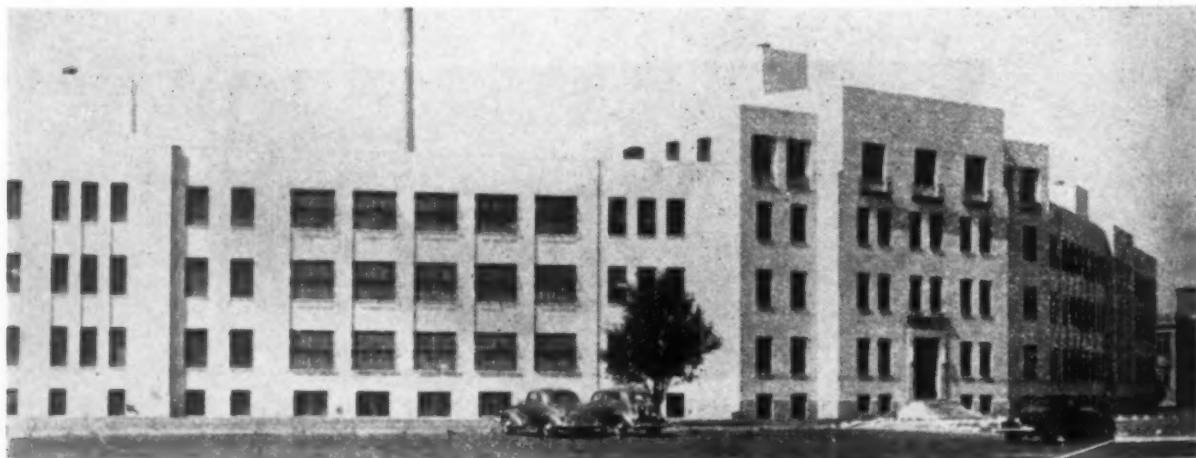
Dr. C. S. Rockhill served as Superintendent from 1912 to 1914 when Dr. A. C. Bachmeyer was appointed Superintendent, both of this institution and the Cincinnati General Hospital. He served in this capacity until 1935 when he was succeeded by the present Superintendent, Dr. Ernest E. Bishop.

In 1926 a small bond issue was passed, and in 1928

a two-million-dollar bond issue was voted for extensive improvements and additions to the hospital. The bed capacity in 1926 was 296 and at the completion of the building program the capacity stood at 640.

The hospital is equipped to provide treatment for all stages of pulmonary tuberculosis in patients of all ages. There is a fully equipped x-ray Department; two modern operating rooms and complete laboratory facilities. Heliotherapy is made available on prescription by the physician. The hospital employs a corps of dietitians to properly plan and supervise food service to the patients and personnel. A Social Service Department is maintained, in conjunction with which a program of adult education and a degree of rehabilitation are carried out.

The total number of patients treated runs well over one thousand each year; treatment days over 200,000 per year. Annual cost of operation is in excess of one-half million dollars.



FRANKLIN COUNTY TUBERCULOSIS HOSPITAL COLUMBUS, OHIO

The Franklin County Tuberculosis Hospital was established in 1907. The present institution has complete facilities for the medical and surgical treatment of all forms of tuberculosis. Diagnostic and treatment out-patient departments are maintained. The hospital has a present bed capacity of 309. The hospital is principally for patients of Franklin County although sur-

gical cases are accepted from other counties where thoracic surgery is unavailable, provided a vacancy exists. The hospital is affiliated with Ohio State University for teaching of Medical and Surgical Tuberculosis.

Dr. Myron D. Miller is Superintendent and Medical Director.

Ohio Sanatoria



Lowman Pavilion — Cleveland City Hospital
CLEVELAND, OHIO

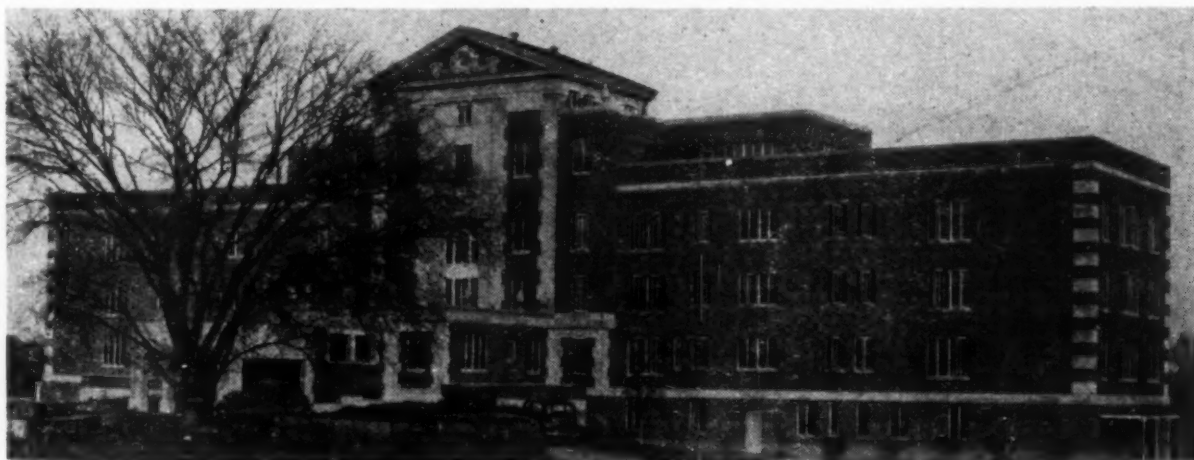
The Lowman Pavilion of Cleveland City Hospital is a six-story building erected in 1933 and devoted exclusively to the treatment of pulmonary tuberculosis. It provides 352 beds, of which an entire unit of twenty-four beds, located on the sixth floor, is devoted exclusively to patients receiving major surgical treatment.

The building is one unit of a 1,500 bed general hospital. Certain central facilities of the general hospital, including those of the surgery, x-ray department, power plant, and kitchen are used to provide service to the Lowman Pavilion. The services of the medical staff of all departments of the general hospital are available

for consultation in the treatment of patients in the Lowman Pavilion.

The entire City Hospital is used as a teaching hospital associated with Western Reserve University, and appointments to the medical staff of the hospital are made by the Director of Public Health and Welfare of the City of Cleveland after nomination by the University.

Patients are admitted only through the Bureau of Tuberculosis of the City Health Department and must be legal residents of Cuyahoga County.



STILLWATER SANATORIUM
DAYTON, OHIO

Stillwater Sanatorium was officially founded in 1908. It is a bi-county institution serving both Montgomery and Preble Counties. The above picture is of the new addition of one hundred beds and is named the D. W. Iddings Building. Mr. Iddings was the Secretary of the Board of Trustees up until the time of his death, and this structure perpetuates his memory through

its wonderful scientific equipment which includes practically all the medical advances in Phthisiology. There is a most adequate consulting staff including surgery and laryngology, and the institution is usually filled within ninety-five per cent of capacity. Out of county patients, however, can be accommodated. Dr. Warren C. Breidenbach is the Medical Superintendent.

Ohio Sanatoria



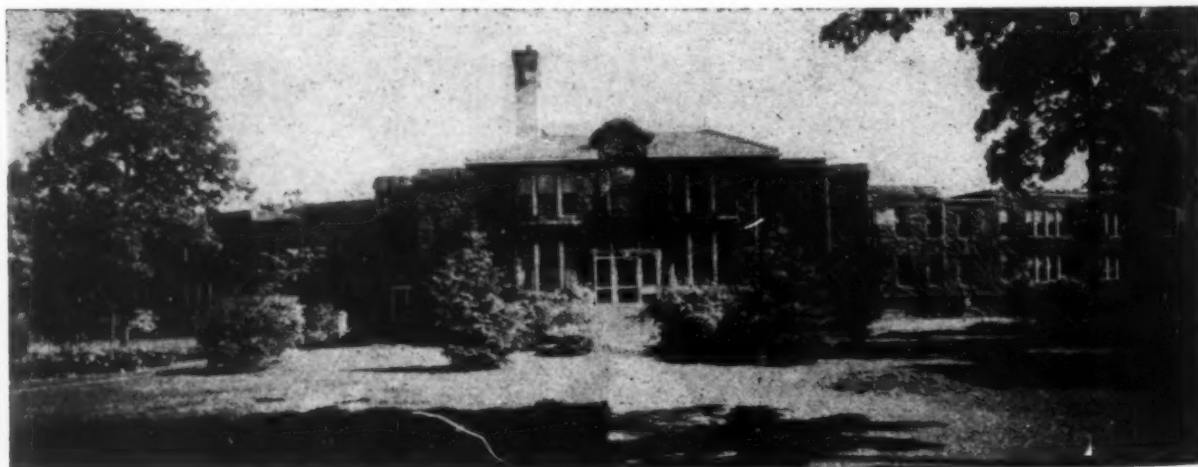
J. M. CASE TUBERCULOSIS SANATORIUM

DELAWARE, OHIO

The J. M. Case Tuberculosis Sanatorium was established in 1934 by the directors of the J. M. Case Hospital and Dr. Louis Mark as a non-profit tuberculosis sanatorium in conjunction with the J. M. Case General Hospital. Dr. Louis Mark has been medical director since its inception. The capacity is 45 beds. All types of tuberculosis cases are cared for, and complete facilities for both medical and surgical work are present

in the hospital. Dr. Henry Bachman is resident physician.

The sanatorium facilities are available to patients of Delaware County and surrounding counties. The rates are \$21.00 per week, which includes medical and surgical care, nursing service, x-ray and laboratory fees, and pneumothorax.



LIMA DISTRICT TUBERCULOSIS HOSPITAL

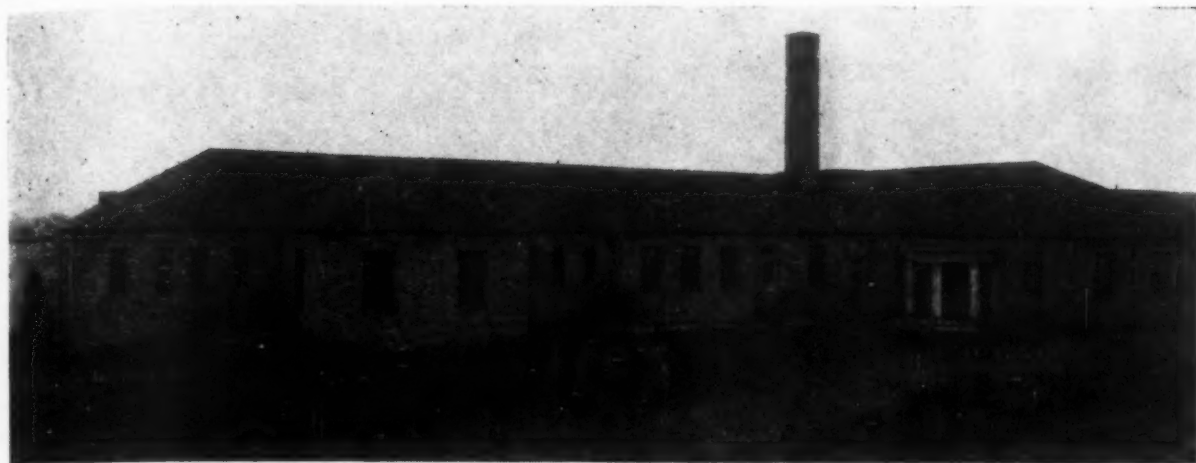
LIMA, OHIO

The Lima District Tuberculosis Hospital was dedicated in April 1911, and in the ensuing years operated progressively both in the treatment of tuberculosis and in the improving of housing facilities for patients and employees. The original capacity of the hospital was thirty-five beds. In 1926, the capacity was increased with the addition of two wings and

in 1934 by the construction of an annex. In 1936 a nurses' home was erected.

At present the hospital has a capacity of 125 beds and is one of the three remaining district hospitals operating in the state of Ohio. It is owned by Allen, Auglaize, Mercer, Van Wert and Shelby Counties. Patients with all types of tuberculosis are admitted.

Ohio Sanatoria



TUSCARAWAS VALLEY SANATORIUM NEW PHILADELPHIA, OHIO

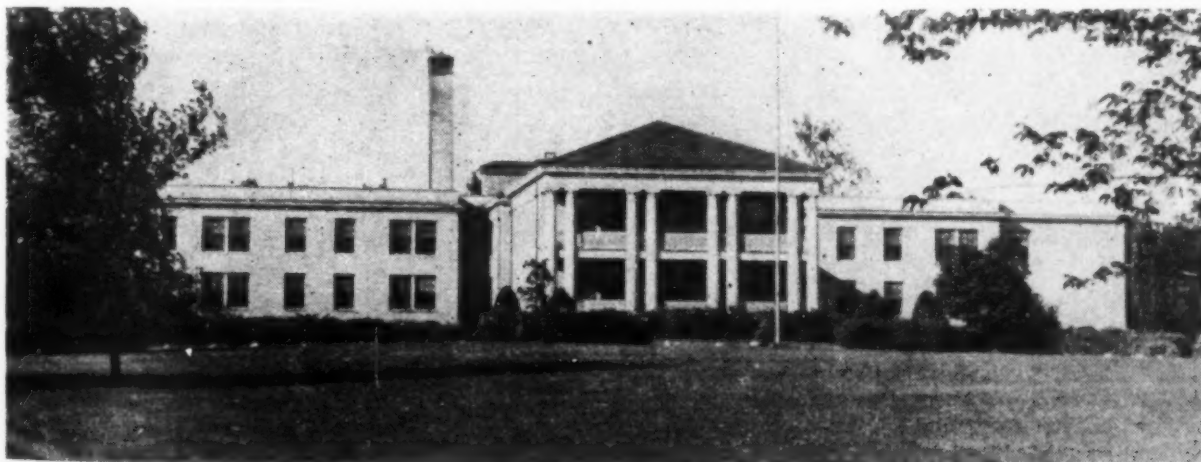
Tuscarawas Valley Sanatorium is a 35 bed institution built and equipped in 1937, at a total cost of \$100,000. Moderately advanced and advanced cases are accepted as patients. The Sanatorium is located two miles east of New Philadelphia overlooking the Tuscarawas River.

The original Board of Trustees consisted of Carl Keplinger, Dover; C. V. Wiandt, Port Washington; and D. L. Fisher, New Philadelphia. Since that time, Harry Smith has replaced Mr. Wiandt on the Board. Dr. William Hudson has served continuously as Su-

perintendent since the opening of the Sanatorium.

Complete clinical service and an active out-patient department are maintained throughout the year for indigent and referred cases of active or suspected tuberculosis.

An adjoining plot of ground is owned by the Tuscarawas County Tuberculosis and Health Association and will be used for the erection of a Preventorium at a future date. This group is quite active in aiding the Institution. At present, a Registered Nurse, Mrs. Elizabeth Barr, is employed to do the field work.



BELMONT SANATORIUM ST. CLAIRSVILLE, OHIO

Ten hundred and fifty feet above sea level—among the sun-kissed hills—and devoted to the care and treatment of tuberculosis, Belmont Sanatorium is located on a forty acre tract of land, four and a half miles west of St. Clairsville, Ohio, the county seat, on Federal Route No. 40.

A substantial fire-proof brick structure, it nestles in the northern edge of a delightful grove of hardwood trees, on ground which slopes gently to the south.

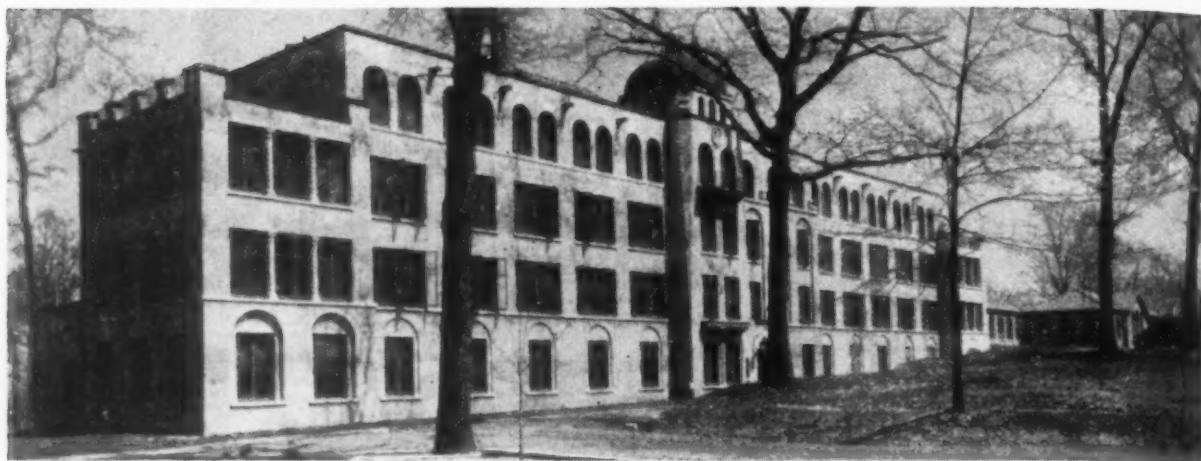
The Sanatorium, with a bed capacity of 52, opened

its doors for the reception of patients in November 1927, and serves a population of about ninety thousand people: industrial, mining and farming.

It is maintained entirely by the county out of appropriations from the general fund, and is administered by a board of trustees appointed by the county commissioners.

W. Miles Garrison, M.D., has been the Medical Superintendent since it's opening.

Ohio Sanatoria



CLARK COUNTY SANATORIUM SPRINGFIELD, OHIO

The Clark County Tuberculosis Sanatorium is the successor of the Second District Tuberculosis Hospital, which was organized in 1910, by Madison, Greene, Champaign and Clark Counties. A fifty-five acre estate on the National Pike, east of Springfield, was purchased and remodeled. Cottages were built on the grounds. The first patients were transferred from a "T. B. Camp" on October 20, 1910. There have been over 2800 admissions.

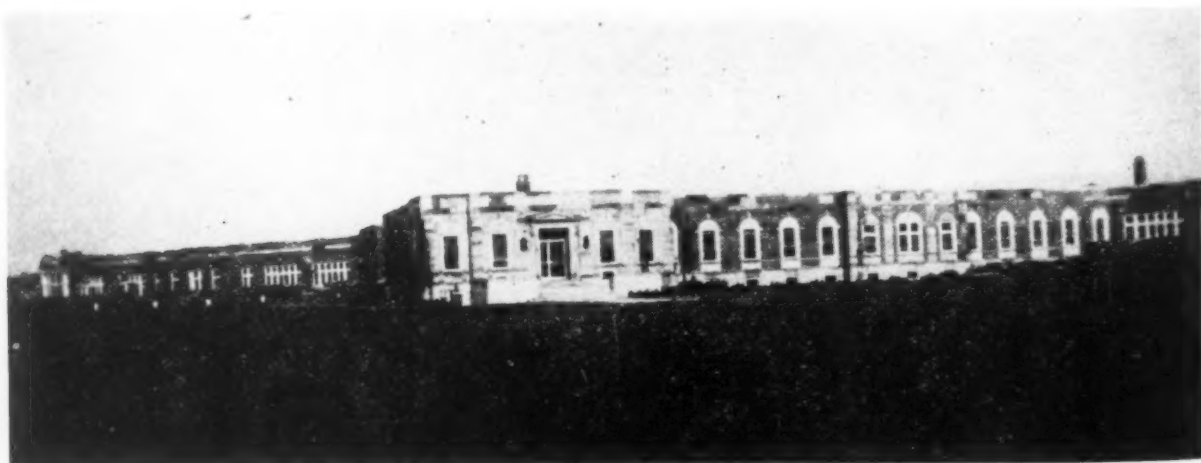
After fifteen years, the District was dissolved and Clark County purchased the interests of the other counties, and built a new Sanatorium building.

The treatment afforded, besides the usual basic

rest, includes pneumothorax, pneumonolysis, phrenic nerve surgery, bronchoscopy and thoracoplasty. Each patient is considered individually in staff conference.

The present bed capacity is twenty-five children in a separate building, and ninety-five adults in the Main Building. The institution is essentially for residents of Clark County; but patients from other counties are admitted, if beds are available, after a completed application for admission is received.

John Srail, M.D., F.A.C.C.P., is Superintendent and Medical Director; Wm. A. Clark, M.D., is Assistant Superintendent; C. Walker Munz, M.D., is Thoracic Surgeon.



Wm. W. ROCHE TUBERCULOSIS HOSPITAL TOLEDO, OHIO

This is a modern 165 bed county sanatorium. It is a one story building divided into five wings. Each wing is in charge of a graduate nurse trained in Tuberculosis. Kathryn Lynch, R.N., has been directress of the institution since it opened on Sept. 20, 1937.

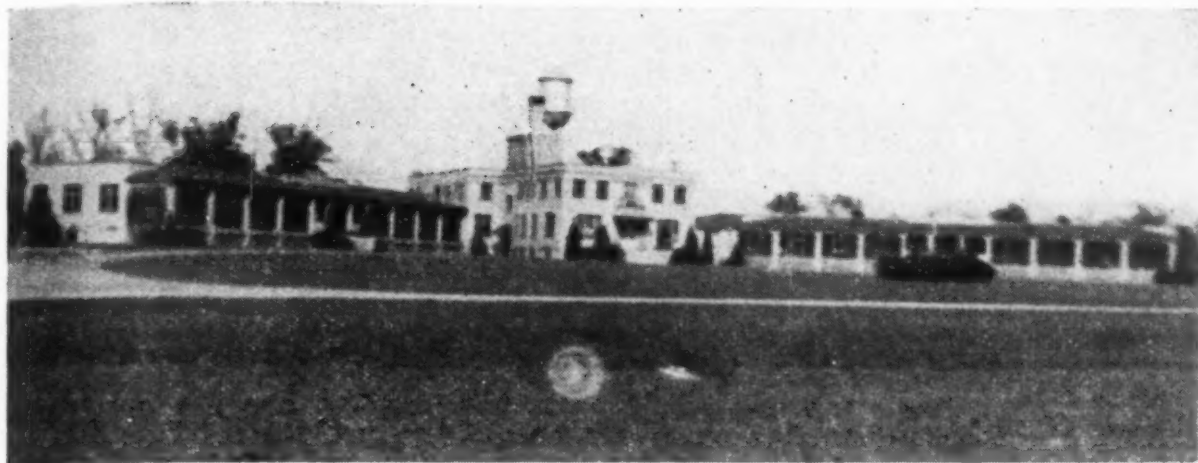
All the modern methods of diagnosis and collapse therapy are used. There are available x-ray and laboratory departments. All the minor surgery, such as pneumothorax, phrenics, pneumonolysis, etc., is performed in special treatment rooms. Major sur-

gery, such as thoracoplasty, is performed at the Lucas County Hospital, which adjoins the sanatorium.

The hospital staff consists of a medical director, Dr. Paul Holmes; a surgical department under the supervision of Dr. Wm. Neill; a resident physician, Dr. M. W. Selman and two internes.

There is an active out-patient department where pneumothorax treatments are available. A recreational supervisor and a vocational rehabilitation service is available to the patients.

Ohio Sanatoria



Trumbull County Tuberculosis Hospital WARREN, OHIO

The Trumbull County Tuberculosis Sanatorium of fifty beds was opened in 1928.

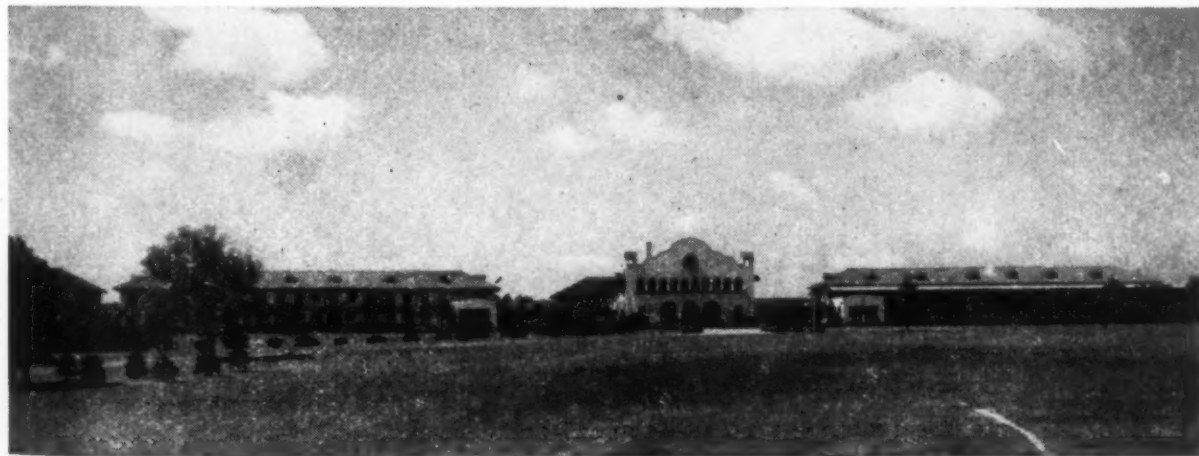
The Sanatorium is located six miles from Warren, Ohio, on the highest elevation in the County. It is one mile from the main highway, assuring a quiet, restful atmosphere to the patients. There are twelve acres of landscaped lawns with an abundance of flowering shrubbery and several hundred pine trees.

The building is of the pavilion type with a center administration building, flanked on one side by the Womens' Wing of twenty-five beds, and on the other side by the Mens' Wing of twenty-five beds. Half of

the beds are in private rooms.

Dr. Edgar P. Adams has been Medical Director continuously, since the Sanatorium opened in 1928. During that time 1,033 cases have been admitted for treatment. Less than one per cent have left against advice. Dr. Joseph Keough of Youngstown, Ohio, performs the chest surgery. A dietitian, technician and six graduate nurses are employed.

Weekly diagnostic clinics are held. Supervision is maintained over post-Sanatorium patients and contact cases by a full-time Field Nurse. A weekly clinic for pneumothorax treatments is also maintained.



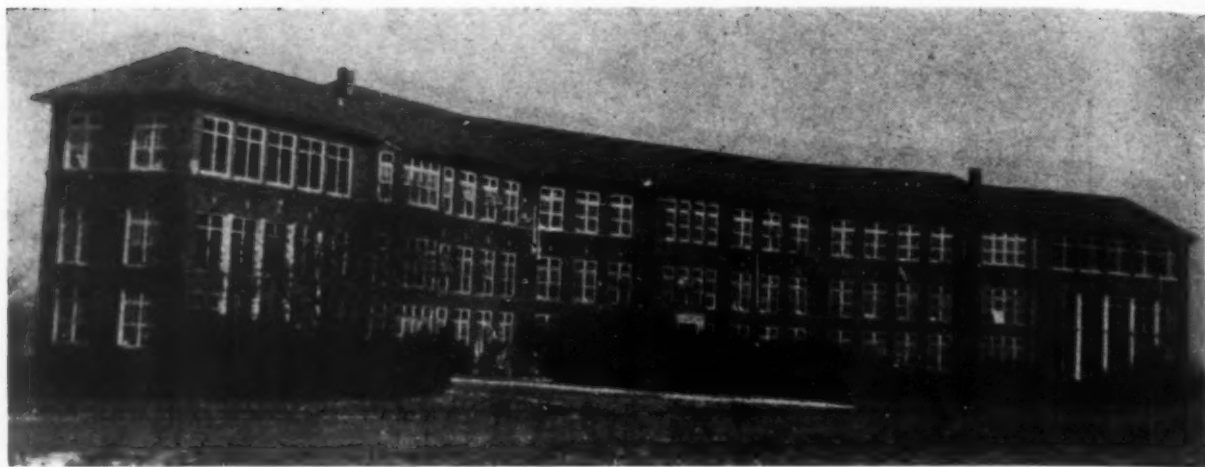
SUNNY ACRES WARRENSVILLE, OHIO

Sunny Acres, the Municipal Sanatorium of the City of Cleveland, is located at Warrensville, Ohio, on the outskirts of Cleveland. The Sanatorium grounds comprise about seventy-five acres. There are ten buildings housing 430 patients and 200 employees; 40 additional employees are not maintained on the Sanatorium grounds. Of the 430 patients, 64 are children. The Sanatorium is built on the pavilion plan and is two stories in height. The most recent section, caring for 100 patients, was opened in 1931. All stages of pul-

monary tuberculosis are cared for and collapse therapy is given, except for major surgical procedures which are performed at the Cleveland City Hospital.

The professional staff includes 52 registered nurses and 6 full-time physicians, in addition to the Medical Director. F. W. Ramsey, Director of Public Health and Welfare, City of Cleveland. R. H. Browning, M.D., Superintendent and Medical Director. Charles Schoen, Business Manager.

Ohio Sanatoria



MAHONING TUBERCULOSIS SANATORIUM **YOUNGSTOWN, OHIO**

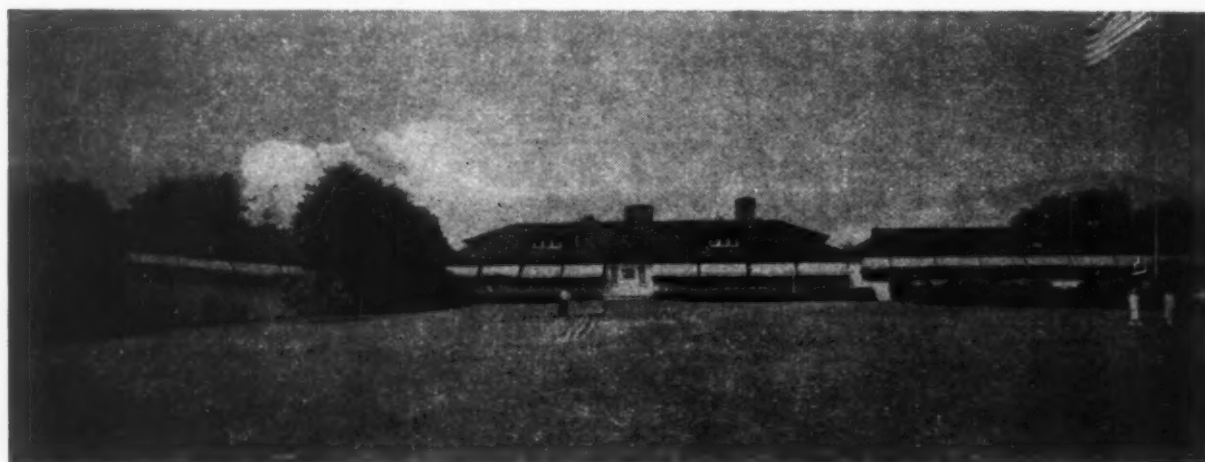
The Mahoning County Tuberculosis Sanatorium was opened on November 23, 1925 with a bed capacity of 67.

In 1930, a cottage for 16 patients and a nurses' home with a capacity for 10 nurses, was built.

In 1936, under W.P.A., a third floor was added, increasing the capacity of the Sanatorium to 180 beds. At the same time, a surgery, laboratory, dental office and other minor operating rooms were added.

The Sanatorium is now equipped to do all types of surgery. There are 94 physicians on the visiting staff, representing all specialties.

The house staff consists of the medical director, Dr. E. E. Kirkwood; three resident physicians, x-ray technician, laboratory technician, dietitian and 23 registered, trained nurses.



The Mount Royal Sanatorium **NORTH ROYALTON, OHIO** **P. O. Brecksville, Ohio**

Located 15 miles southeast of Cleveland, Ohio. Elevation 1240 feet. 50 acres of rolling country estate. Capacity 110 beds. For all stages of adult Pulmonary Tuberculosis. All modern methods of collapse therapy employed.

Norbert S. Greene, M.D.
Medical Director

Interpretation of Chest X-Ray Films

DAVID W. HEUSINKVELD, M.D., F.A.C.C.P.

Cincinnati, Ohio

The interpretation of the shadows seen on the films of the chest involves more than simple identification of what meets the eye. If one keeps in mind the dynamic forces of pathological reactions, much can be actually seen and as much more inferred.

There is such a wide variation in the appearance of films of healthy individuals, principally because of size, shape and age, that to describe a normal chest is impossible; it is most important however, to think in terms of the healthy chest. One should study the films of many healthy people to learn average appearances before attempting to describe and interpret the changes resulting from pathological processes.

All that can be seen on any x-ray film is the shading from black to white forcing us to identify the original structure by the densities it casts upon the film. As the x-rays pass through a chest, the resulting pattern on the film permits us to study anatomy without actual dissection, and as disease complicates the shadows on the film, we may study pathology without actually seeing the tissue with the unaided eye or through the microscope. This necessarily imposes certain limitations upon complete diagnosis, but it is often an invaluable aid in directing the campaign toward that end.

To get the most out of a chest film an orderly approach is necessary, and we follow the example of the anatomist of proceeding from that which is external to that which is internal. The soft tissues on the outside of the bony cage must be scanned for irregularities and for the state of nutrition. The latter is best determined by studying the axillary folds where malnutrition throws them out in bold relief, above the clavicle and along the lateral wall. The breast shadows of the female may be significant, particularly when one of them is absent.

All of the visible bones on the film must be carefully studied. Anomalies of the ribs are not infrequent; contraction of the ribs resulting from organized pleural exudate and adhesions may be noted. Old or recent frac-

tures may give a clue to other obscure shadows. In apical densities, destruction of the overlying ribs will distinguish between a heavily thickened apical pleura and a superior pulmonary sulcus tumor. Pulmonary emphysema causes the ribs to leave the spine more horizontally than normal.

In studying the internal soft tissues of the chest, it is helpful to consider them as being suspended from the base of the skull after the manner of a pendulum. If they are dislocated from their normal positions, a pathological process may be exerting a pulling or pushing force. This factor is usually easy to determine and is most important. Rapidly growing tissues such as tumor or fluid will push, while scar tissue exerts a pulling force. The loss of a normal constituent of the chest will cause a dislocation of the remaining viscera toward that side, such as occurs when air is absorbed from the alveoli, producing atelectasis.

In properly exposed films, the decreased density of the trachea and mainstem bronchi should be visible. Normally, the trachea is in the midline, sloping slightly to the right in its lower portion if the patient's position is symmetrical with that of the central ray. Deviation of the trachea is significant except in scoliosis. Narrowing of the trachea and mainstem bronchi should be looked for.

Normally, the aorta is always to the left side of the spine at about the level of the fifth thoracic vertebra. The width of the aortic arch varies with the age and size of the individual. It sometimes appears to be abnormally wide in fat individuals because of the upward lift of abdominal fat. This is also true for the heart shadow. Calcification in the arch is frequently noted together with apparent elongation in the later years of life.

The size, shape and position of the heart should be carefully studied. It is well to remember that the apex of the heart, as seen on the film, usually does not correspond with the clinically measured apical beat when the mid-clavicular line is used as the base line. In both instances it is more accurate to use

the mid-sternal line. The heart is easily shifted from its normal position by pushing and pulling forces. Both the heart and aorta can be dislocated upward by fibrotic contractions in one or both of the upper lobes.

The domes of the diaphragm should normally be smooth, gently arched, the right about $1\frac{1}{2}$ cm. higher than the left. Irregularities, tenting, and attachments to the lateral walls should be noted for evidences of subdiaphragmatic influences, and for the presence of pleurisy. In pulmonary emphysema they are apt to be lower and flatter than normal.

The pleurae are normally invisible. Thickening of the pleura is often visible under the second ribs in apparently healthy people. An old pleuritis can frequently be detected under the ninth rib in the mid-axillary line. Interlobar thickening can be seen as linear markings, though seldom do they show the entire extent of the interlobar fissure. Calcification of the pleura is the late result of pleural effusion and not infrequently of hemothorax and empyema.

The anatomical hilum is wholly outside of the lung and is best seen on the film on the left side, only the left bronchus and the pulmonary artery showing up as distinct entities. The x-ray hilum, which lies lateral to the anatomical hilum, is easily seen, but is difficult to describe; it is made up of the first divisions of the mainstem bronchi, the pulmonary artery and vein, bronchial artery and vein, lymph glands and supporting connective tissue. Its vertical limits are fairly constant and are covered by two interspaces and a rib. The upper border of the left hilum is formed by the superior surface of the pulmonary artery; the upper border of the right hilum by the eparterial bronchus. The outer limit is indefinite, extending almost to the imaginary line of the inner third of the lung. Its density is variable under normal conditions, but with properly exposed films one should be able to look through it. When of a heavy homogeneous character, it is definitely abnormal. One should look for enlarged lymph nodes as well as for evidence of calcification. It is important to remember that the upper portion of the lower lobe covers the hilum density, and that this area is frequently involved in pathological pro-

cesses. Good stereoscopic films are necessary to separate the densities for accurate localization. Between the bronchi to the lower lobes and the heart there is normally a more or less rectangular dark area, seen best on the right side. When this area is obliterated, it is definitely pathological; it is frequently mistaken, then, as an enlarged hilum density, whereas it is wholly outside of the hilum and represents a lesion in the lower lobe.

The trunk densities are composed of bronchus, pulmonary artery and vein, bronchial artery and vein, lymphatics and supporting connective tissue. It is impossible to separate these densities into their component parts. They vary in size normally, and end short of the periphery of the lung; when extending to the pleura, some abnormality is present. Variation in the size of the trunks may be due to bronchial, vascular or lymphatic lesions. Simple bronchial infections do not change the pattern sufficiently to permit an etiological diagnosis; chronic bronchial infections that are generalized are apt to show abnormally heavy trunks. These heavy trunks may suggest a chronic bronchial infection, but the final diagnosis must rest upon substantiating clinical findings.

Heavy trunks in a localized area may suggest bronchiectasis, but this diagnosis should not be made from the films alone. Enlarged trunks secondary to cardiac lesions may be suggested by an irregularly shaped heart. With advancing age, the trunks become heavier but not actually larger, due to changes in the arterial walls. Trunks that are tortuous are due to vascular changes rather than to disease of the bronchi. The perivascular and peribronchial lymphatics may modify the appearance of the trunk densities as a result of previous respiratory infections. Beading or studding of the trunks not uncommonly follows tuberculous infection, probably as a result of scarring.

By studying the distribution of the trunks, it is possible to localize the lobes of the lungs. This is important and is possible only with good stereoscopic films. Foreign bodies should be localized in the correct bronchus and lobe for the best bronchoscopic approach. Abscess cavities can be localized for accurate surgical approach; cavities in the apex of the lower lobe overlie a considerable portion of the

upper lobe and only by studying their relation to bronchi can they be accurately localized. It is not possible here to give the anatomical distribution of the bronchi to their respective lobes. Suffice it to say that by careful study of good stereoscopic films accurate localization of the lobes is possible, some films showing it to much better advantage than others.

It is not my purpose, nor is it possible, to cover the x-ray findings of all lung lesions, but rather to show how the problem of interpretation is approached. A good example is that of pulmonary emphysema. With the aid of a microscope, the diagnosis is made by studying the alveoli; the problem is more complex when studying only the films because we can't see the individual alveoli on it. In the first place, we must have fixed in our minds the appearance of an emphysematous chest, the emphysematous lung itself and the clinical manifestations of the disease. Then, when studying the films, we may note that the ribs leave the spine more horizontally than is normal; the lung fields are somewhat blacker because of the increased air content; the trunk densities are heavier and are more widely separated than average; the pulmonary arteries stand out prominently at the roots of the lung and in the hilum density; the domes of the diaphragm are low and flattened. This combination of clues is definite evidence of the presence of pulmonary emphysema, but any one of these observations is not sufficient to establish the diagnosis. The fluoroscopic examination would show in addition that the movement of the diaphragm was limited and held in a state of inspiration; that the bases of the lung failed to darken on complete expiration and that the heart was separated from the anterior chest wall. Such a build-up is necessary because of the indirect methods of examination.

Simple exudative lesions in the lungs cast densities on the film of a homogeneous character. One might say then that a bronchopneumonia or a lobar-pneumonia is suggested, but an exact etiological diagnosis is not possible. The only infectious disease that can be etiologically diagnosed is chronic apical pulmonary tuberculosis, and its relapsing characteristics permit such a diagnosis. The

differing densities of exudate, caseation, fibrosis and calcification represent lesions of different ages which form a pattern characteristic of only tuberculosis. This pattern is classically found only in the upper lobes. The tuberculous lesions limited to the lower lobes remain undifferentiated and only the finding of tubercle bacilli in the sputum permits a positive diagnosis. Cavities present in the upper lobes usually have sufficient associated pathology to make possible an accurate x-ray diagnosis of tuberculosis, but cavities in the lower lobes are associated only with exudate, which may have other etiological factors. In general, we may say that x-ray films record the existence of exudate in the lung, but from that fact alone we are unable to make an etiological diagnosis except in some cases of the chronic type of apical pulmonary tuberculosis.

Benign tumors can occur anywhere in the chest, showing densities on the film of any size and shape, but usually with smooth contours. Accurate diagnosis is extremely difficult. Primary malignant tumors occur in all manner of form without definite distinguishing features, but if clues are diligently sought for a great deal of presumptive evidence may be found. In all instances, additional evidence is necessary to establish an exact diagnosis. Tumors of the bronchi are apt to be occlusive, resulting in absorption of air distal to the obstruction. This may involve the distribution of a single bronchus, an entire lobe or the entire lung, depending upon the location of the tumor. The resulting atelectasis produces a dislocation of all viscera and the corresponding half of the diaphragm to that side.

The lateral view of the chest is valuable in that it throws into bolder relief some conditions that may only be suspected from the standard antero-posterior view. It may also show conditions that do not appear at all in the antero-posterior exposure, namely the posterior border of the heart, the deep sulci posterior to the domes of the diaphragm, and the horizontal arch of the aorta. In studying pulmonary emphysema, the upper anterior and posterior dark areas are shown to good advantage and it may show separation of the heart shadows from the anterior chest wall. When the heart is adjacent to the anterior chest wall in the presence of pulmonary

emphysema, pericardial adhesions are present. Interlobar effusions are often more clearly defined in the lateral view.

The use of lipiodol in bronchography emphasizes the limitations of the plain film. A well filled bronchial tree provides exceptional opportunity to study the size and shape of the bronchi and the localization of the lobes. It is the method par excellence in determining the degree and extent of bronchiectasis. It is of less value in studying cavitation, whether tuberculous or non-tuberculous, because the majority of cavities cannot be made to fill and show fluid levels. It is often difficult to differentiate parenchymal and pleural densities; with the injected bronchial tree this difficulty is more easily resolved by noting the distribution and configuration of the trunks. A mass in the pleura or pleural

cavity bulging into the lung field results in distortion of the bronchi. Bronchography is particularly useful in studying bronchial obstructions, whether due to foreign body, new growths, or bronchial stenosis; and, where the obstruction is due to a bronchogenic carcinoma, aids in determining operability.

Conclusion

The interpretation of the densities observed on x-ray films of the chest demands a knowledge of normal anatomy, the pathogenesis of disease primarily or secondarily involving the chest, the dynamic forces exerted by pathological processes, and finally the correlation of the densities, symptoms and physical findings. Much confusion will be avoided by consultation between roentgenologist and internist.

A BRIEF SUMMARY OF THE TUBERCULOSIS CAMPAIGN IN OHIO—(Continued from page 359)

was established under the Ohio State Board of Health with a legislative appropriation of \$40,000 for the biennium.

Between 1914 and 1920 not much advance was made in the creation of new machinery or agencies to control tuberculosis due to the dislocation caused by World War No. I.

In 1920 a direct approach to the school health problems was begun with the institution of the Modern Health Crusade by the Ohio Public Health Association with the active cooperation of the State Department of Education. In 1922 a "Course in Hygiene" was prepared for the teachers in the schools. In 1923 the General Assembly passed the "Physical Education Law" and in 1927 the first supervisor of health and physical education was employed in the State Department of Education.

The first educational campaign on the Early Diagnosis of Tuberculosis was conducted in Ohio in 1927. Increased emphasis began to be placed upon the value of the x-ray and tuberculin test in discovery of early cases of tuberculosis.

In the years intervening between 1927 and the present time the program in Ohio has been devoted not so much to creating new agencies and institutions as it has to implementing and strengthening the avenues of attack which were initiated in the early years of the campaign. Today we are concerned with the problems of tuberculosis in industry, among the negroes and among the young women. We enter the final stages of the battle with our forces well organized to meet successfully whatever emergencies may arise.

ROBERT G. PATERSON, Ph.D.

CHARLES OLIVER PROBST, M.D.

(Continued from page 360)

consumption is a contagious disease; and that without proper precautions every patient is a source of danger to those about him."

Following this clear-cut expression of professional opinion, Dr. Probst plunged into the fight against the disease in earnest. In 1894 the State Board of Health issued its first popular educational circular on the subject. It was entitled "The Prevention of Consumption." Thus was launched the educational movement against the disease which has been gaining momentum with the passing of the years.

In a paper read before the Section on State Medicine of the British Medical Association held at Toronto in 1897 we find Dr. Probst advocating hospitalization of cases of tuberculosis by state and local government authorities. This paper marks the beginning of the sanatorium movement in the state.

At a meeting of the State Board of Health, April 10, 1901, Dr. Probst presented a report on the subject of tuberculosis and recommended the organization of a state association for the prevention of tuberculosis. This suggestion became a reality on November 14, 1901, when the Ohio Society for the Prevention of Tuberculosis (now the Ohio Public Health Association), was organized.

These three lines of endeavor mark in broad outline the form of the fight against the disease in Ohio. Throughout the remainder of his life, Dr. Probst was identified closely with the national, state and local developments in the tuberculosis movement. The bibliography of his writing is illuminating as it shows his intense interest in the leading public health problem of his day. He died of pneumonia in Columbus on April 2, 1933, being slightly over 75 years of age.

A Twin Spirometer for Bronchspirometry

PAUL W. GEBAUER, M.D.*
Cleveland, Ohio

The purpose of this paper is a description of a twin spirometer which I have designed for clinical bronchspirometry. This instrument is used with a special rubber catheter, but could be used with any similar device such as the double bronchoscope described by Jacobaeus and Freneckner.¹

A description of my catheter and the technique of its use in bronchspirometry have been published.² Figure 1A is a diagram illustrating how the catheter separates the air channels to the lungs and permits the study of each side separately and simultaneously. These catheters are sold by American Cystoscope Makers Inc. They are made of latex and contain enough barium to make them easily visible under the fluoroscopic screen. A steel coil spring is incorporated in the catheter wall which produces a desirable semi-rigidity. The catheter is supplied in three sizes so that it is adapted to the wide range of bronchial dimensions produced by collapse as well as by the variation in the size of patients. It is advisable to use as large a size as possible. The largest can be used only in large males. The smallest size is used in small females, or in those patients in whom pulmonary collapse has caused a contraction of the left bronchus. The right main bronchus has been found unsatisfactory for bronchspirometry because of the short distance between the carina and the right upper lobe orifice; consequently, stenosis of the left main bronchus may make the procedure impossible.

The catheter is inserted through the glottis by means of a direct laryngoscope, and then guided into the left bronchus with the aid of the fluoroscope. Its natural curvature to the left facilitates this passage. It is usually passed down until the tip is visible just lateral to the left cardiac border. Good anesthesia is essential and is accomplished by spray and intratracheal injection.

Relative dryness of the tracheobronchial tree is desirable so that postural drainage or cough and expectoration are carried out be-

the catheter is in position the balloons are inflated and each side of the catheter is connected to a separate respiratory spirometer.

I first used two standard basal metabolism apparatuses for spirometers, and although fair records were obtained, they were not entirely satisfactory. The speed of the moving record could not be accelerated, and rapid shallow respirations, therefore, were not well separated. The usual basal metabolism apparatus has a capacity designed for both lungs, and a rather voluminous spirometer bell of large diameter. With such an instrument, an inspiration of 500 cc. might cause only a 1 cm. fluctuation of the bell, and when it is connected to a single lung, in which the tidal volume may be 200 cc. or less, the fluctuation on the record is too small. In addition, two instruments recorded each lung on a separate record, rather than both lungs on a single graph.

For these reasons, with the financial aid of Cleveland City Hospital and its staff, the McKesson Appliance Company of Toledo, Ohio constructed a special twin spirometer (Figure 1B). This instrument records the fluctuations of both lungs on the same record. The record carrier is driven by an electric clock mechanism which can be accelerated. The record consists of a graphic paper from which one can calculate oxygen consumption per minute, tidal volume, complementary and supplementary volumes, and vital capacity. Each small square in the vertical axis represents a respiratory volume of 50 cc. or 50 cc. of oxygen and in the horizontal axis, one tenth or one twentieth of a minute depending on the speed used (Figure 2B). Each spirometer bell has a capacity of four liters. This apparatus makes a suitable record with every variety of respiration. Satisfactory records have been obtained when the respiratory rate was 40 per minute, and the tidal volume of one lung was less than 100 cc.

Inasmuch as ventilation is recorded and usually corresponds to the carbon dioxide output, it was thought that for clinical purposes, it would not be necessary to include in the

* From the Department of Thoracic Surgery, City Hospital, and Western Reserve University, Cleveland, Ohio.

instrument the equipment for the measurement of carbon dioxide. Each bell contains a soda lime cannister for the absorption of carbon dioxide, rather than a caustic solution and acid for its liberation and subsequent measurement.

An air pressure manometer is installed on the instrument panel for the inflation of the balloons. Screw valves are incorporated in the catheter connections so that the patient may be shunted from the apparatus to room air or vice versa. The electric motor is driven by alternating current, and is coupled with a chain drive, gear shift mechanism which permits acceleration or slowing of the record by simply turning a knob.

An example of the type of record is reproduced in Figure 2B. It indicates that the pulmonary function is practically the same on each side. The roentgenogram (Figure 2A) shows a bilaterally equal collapse with extrapleural pneumothorax on the right, and intrapleural pneumothorax on the left. Before

extrapleural operation this patient had a fairly good vital capacity and no clinical discomfort in spite of the collapse on the left side, so that bronchspirometry was not deemed necessary before the institution of a revocable extrapleural collapse. However, if thoracoplasty had been indicated, it would have been comforting to know that the left side, in spite of the pneumothorax, was capable of such good function.

There are patients with diminished respiratory capacities who need bilateral or even unilateral collapse whom we cannot treat safely until we know the separate functions of the two sides. Bronchspirometry will often tell us that a thoracoplasty might be hazardous, and a revocable collapse much safer. At times, it will indicate that even a phrenic would provoke too much dyspnoea. Occasionally, we will find a partly collapsed lung which, in spite of clinical and x-ray evidences, has sufficient function to permit rather extensive collapse on the other side.

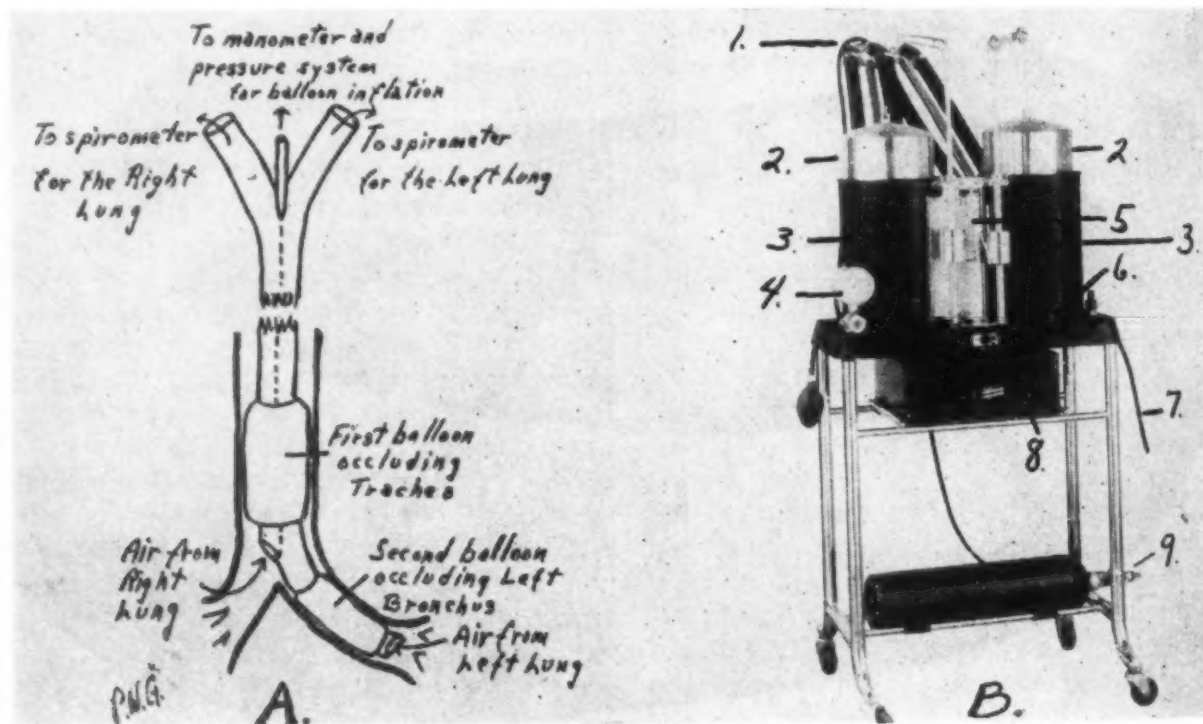


FIGURE I

A—Diagram of catheter in position in the trachea and left bronchus. Air from the left lung is confined to the left barrel of the catheter by the distal balloon. Air from the right lung is trapped between the balloons and therefore enters the sidehole opposite the right bronchus, and is confined to the right barrel of the catheter.

B—Photograph of twin spirometer. 1—two-way valves in tips for connection to the catheter. 2—spirometer bells. 3—water-seal cylinders containing rubber flap valves and soda lime cannisters. 4—air pressure manometer and hand-bulb for balloon inflation. 5—writing points and graphic record on revolving shaft. 6—switch for electric clock motor. 7—cord to wall plug. 8—switch for acceleration of record. 9—oxygen tank for filling of spirometer bells.

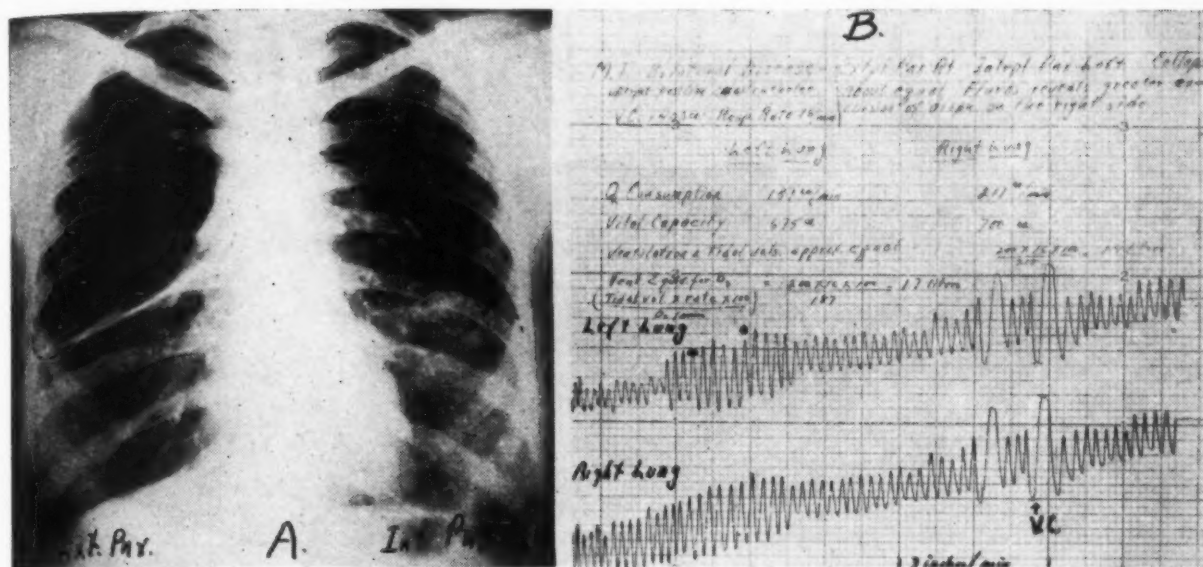


FIGURE II

A—Chest roentgenogram of a 27 year-old white female with a right extrapleural pneumothorax of 9 months duration and a left intrapleural pneumothorax of 1 years duration. Onset of tuberculosis 2 years previously with bilateral apical cavities. Sputum now absent. Marked clinical improvement. Vital capacity 1400 cc.

B—Bronchspirometry record at time of roentgenogram in A. The gradual climb of each curve represents the oxygen consumption of that lung. Respiratory rate is 16/min. Average tidal volume is 200 cc. for each lung. Vital capacity is 675 cc. on the left and 700 cc. on the right. The records are quite similar. The greater superior excursion of the intrapleural side, as noted fluoroscopically, was balanced by the greater diaphragmatic excursion on the extrapleural side. Possibly because of the more extensive original disease on the left side, its oxygen intake per minute is slightly less than on the right.

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JOHN H. LOWMAN, M.D.

(Continued from page 360)

Dr. Lowman awakened the public to the possibilities of conquering tuberculosis and inspired many to "do something about it." A man of broad culture, he was loved alike by the layman and professional worker, the poor and the wealthy. Dr. Lowman's biographers agree that his essays surpassed any literary efforts in Cleveland medical circles. He also composed 70 sonnets.

Italy, a land that always delighted and enchanted Dr. Lowman, lured him to his death. He journeyed to Italy in September, 1918, as

medical director of the American Red Cross Tuberculosis Mission. The vicissitudes of ocean travel, scientific inquiry and military life culminated in an attack of influenza soon after he landed in Rome. Dr. Lowman returned to America where he died in New York City, January 23, 1919.

The late Hon. Newton D. Baker, then secretary of war, paid this tribute to Dr. Lowman:

"When the world's great test came, he could not help sacrificing himself to minister to the stricken and suffering. Surely he died a soldier's death after living, in the best sense of the words, a physician's life."

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History of the West Virginia Tuberculosis
and Health Association

GEORGE F. EVANS, M.D.

At a meeting of the American Anti-Tuberculosis League in Atlanta City in 1907, Mrs. S. W. Price of Scarbro, West Virginia was invested with authority to promote a state-wide organization in West Virginia. In December of 1907, there was organized the West Virginia Anti-Tuberculosis League. This was the first concerted effort in West Virginia to promote any scheme of tuberculosis control. Dr. Harriet B. Jones of Glendale, West Virginia, was appointed Executive Secretary in 1908. Dr. Jones is the pioneer of all tuberculosis efforts in West Virginia and from her untiring efforts, often supported with little financial resource, there was laid a firm foundation and structure for all the Anti-Tuberculosis work that has since developed in West Virginia.

The tuberculosis league was instrumental in securing appropriations for a small state sanatorium in 1913. The league, during the same year, was able to influence two counties to open their own sanatoria, and persuaded three counties to employ full-time tuberculosis nurses.

The first Red Cross Seal Sale was begun in 1909 and state funds were used to continue the exhibit service, and to provide tuberculosis surveys in several counties. Tuberculosis nurses and a full-time physician were employed as funds were available. The league kept alive the agitation for tuberculosis beds in Sanatoria and a slow but continuous program of construction went on at the State Sanatoria.

In November 1920, the West Virginia Anti-Tuberculosis League became known as the West Virginia Tuberculosis and Health Association, and the work was reorganized. During this year Mr. George C. Rowell came from New Hampshire to assume the duties of Executive Secretary. More county surveys were undertaken to determine the extent of the tuberculosis problem. As a result of these surveys, full-time county health units were permanently established in several counties of West Virginia. Counties during this period were urged to set up their own societies, integrated with the state society. The more populous counties quickly developed their own organizations and carried on their own seal sale fund raising programs. About five counties during this period built county sanatoria, where far-advanced pa-

tients could be hospitalized.

Whenever funds were available, tuberculosis clinics were held under the auspices of the county and state associations. In the fall of 1925, Dr. H. G. Wildman was appointed as full-time state clinician. Dr. Wildman had not only a wide experience in clinical tuberculosis, but with unusual tact, was able to promote an interest in tuberculosis that had not before been present in West Virginia. After his death in 1927, the medical program lagged. In 1930 the state legislature granted to the state association \$10,000 per year for clinic services, providing that the state association would expend an equal amount. This sum permitted the employment of three full-time nurses and qualified physicians were employed on a fee basis from several of the large cities. The association purchased two portable x-ray units. This service has been continued by successive legislatures.

This clinic service has examined 30,008 patients and taken 15,747 x-ray pictures. Of this number 1,710 patients with active curable tuberculosis have been referred to sanatoria. More than 120,000 tuberculin tests have been performed. West Virginia has now a mobile x-ray unit operated through the State Department of Health, so it is probable that much of this field work will now be taken over by official bodies and the State Tuberculosis Association will confine more of its time to educational purposes.

The state association has spent 27.4 per cent off all its funds on medical service. The average percentage of funds spent by state associations for this service according to the National Tuberculosis Association compilation is 5.6 per cent. Through the effort of the West Virginia and Health Association, thirty-two counties now have their own tuberculosis societies. Six of these have been organized during the summer of 1940 through the efforts of Mr. E. P. Wells who was recently added to the state personnel in the capacity of Field Secretary.

On September the 14th, 1940, the Association was deeply grieved by the death of its Executive Secretary, Mr. George C. Rowell. The activities of the organization are at this time under the direction of the acting Executive Secretary, Mr. E. P. Wells.



WALTER EDWARD VEST, M.D.

1882 -

Dr. Vest is an exceedingly modest man, so modest that it has been difficult to obtain information about him for this brief sketch.

He is a Virginian, born in Floyd County, in 1882, the son of William Madison and Mary Susan (Boone) Vest. He was graduated from William and Mary College in 1902, where he won a Phi Beta Kappa key. He taught German at William and Mary for two years after graduation, and has been sufficiently interested in his Alma Mater since then to work actively in its alumni association, of which he was president in 1927. In 1936 the alumni medallion was conferred upon him for his service to the alumni association.

He completed a four-year course at the Medical College of Virginia in three years, and was a member of the Phi Beta Pi there. He took his M.D. degree in 1909. After a period of internship and postgraduate study in Richmond and New York, he began a general practice in Meherrin, Virginia. In 1915 he moved to Huntington, West Virginia, and specializes there in internal medicine. He was president of the General Alumni Association of the Medical College of Virginia in 1931.

He was married in 1910 to Miss Saddle Blankinship, of Brookneal, Virginia, and they have a son, Walter, Jr., now following in his father's footsteps as a student in the Medical College of Virginia.

During the World War, Dr. Vest was Chief of the Medical Service at the base hospital at Camp Wadsworth, South Carolina, where he was highly

Tuberculosis Pioneer in West Virginia

regarded and is affectionately remembered by his associates.

Dr. Vest is a member of the American Therapeutic Society and a Fellow of the American College of Physicians, formerly on the Board of Governors of that organization. He is also the Governor of West Virginia for the American College of Chest Physicians. He is President of the Public Health Council (Medical Examining Board) of West Virginia and has been for several years a member of the House of Delegates of the American Medical Association. He is now serving as a member of the Committee of Seven of the American Medical Association, to meet with representatives of the Federal Government to consider a health program for the United States.

In West Virginia he has worked tirelessly for organized medicine. He has been president of the county and state medical societies, of the Chesapeake and Ohio Surgeons' Association, and associate editor, and editor, of the *West Virginia Medical Journal*, one of the best and most widely read of the state periodicals. He is affiliated with the Methodist Church, the Masonic Order, the Kiwanis Club, and is a democrat.

The Southern Medical Association has had his enthusiastic support since 1913. He became a member of its Council in 1925 and Chairman in 1929, in which position he served for two years. He has also been Chairman of the Section on Gastroenterology, and in 1938 became President.

Dr. Vest does not drink or play cards, and is not even a golfer. According to his intimates, his chief diversion is medical reading. Organized medicine, like many of the world's great governments, is now under stress from many quarters. It needs in prominent positions men of ability, ideals and clean life, whose characters are, like Dr. Vest's, a guarantee of capable and unselfish leadership of which future generations will be proud.

Tuberculosis Pioneers in West Virginia



J. G. PETTIT, M.D.

1880 - 1929

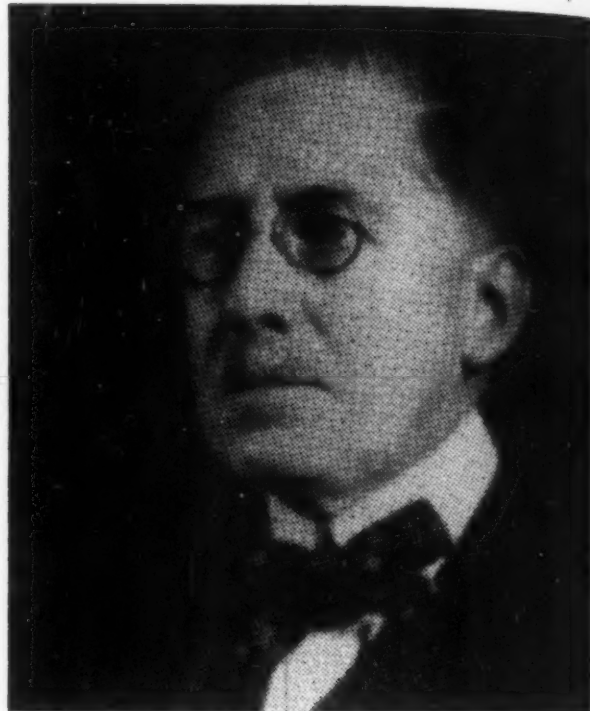
Dr. J. G. Pettit was born at Trimble, Ohio, in 1880. He attended Ohio University at Athens, and graduated in Medicine at Loyola Medical School, Chicago, in 1902.

After graduation, Dr. Pettit came to West Virginia and commenced the practice of medicine at Clay Court House. There he remained for four years. He went to Chicago for some graduate study and returned to West Virginia as Staff Physician at the Weston State Hospital at Weston, West Virginia. He remained in Weston continuously for eighteen years.

In 1924 Dr. Pettit was requested by Governor Morgan to take the Superintendency of the State Sanitarium at Hopemont, West Virginia. Dr. E. E. Clovis who had been Superintendent since the establishment of the Institution had resigned to enter private practice.

Dr. Pettit remained at Hopemont until his death on December 20, 1929. During his five years as Superintendent, he was responsible for many improvements in the Institution. The Sanitarium enlarged from 260 to 425 bed capacity. A new modern hospital and a children's building were added during this period. Changing methods of treatment were effected at the Institution during his term of office. For four years Dr. Pettit was President of the West Virginia Tuberculosis and Health Association and in this capacity he furthered clinic activities and tuberculosis health education throughout the state. He was a competent physician, capable administrator and kindly adviser to thousands of patients who still revere his memory. He did more to influence legislation for Sanitarium expansion than any other West Virginian.

He is survived by his widow, Mrs. Grace Goss, and three children, Mrs. George Evans, Clarksburg; Mary Lou Pettit and Dr. H. S. Pettit.



GEORGE C. ROWELL

1874 - 1940

The history of Tuberculosis in West Virginia contains no brighter name than that of George C. Rowell. Mr. Rowell was born in Ogdenburg, New York. He graduated at Union College, Schenectady in 1899, and for several years thereafter was actively engaged in newspaper, magazine and educational activities. At one time he was Secretary for the Schenectady Chamber of Commerce. He acquired a great deal of training in the field of Social Service and Public Health and was inspector of Hospitals, Sanatoria, Dispensaries and Children's Institutions in the state of New York for a period of ten years. Mr. Rowell was secretary of the New York Conference of Charities and Correction for two years and resigned this position to go to New Hampshire as executive officer of the New Hampshire Tuberculosis Association.

In 1920 he came to West Virginia as Executive Secretary of the West Virginia Tuberculosis and Health Association. He held this position for twenty years until his death on September 14, 1940. Throughout these years he labored untiringly for the cause of tuberculosis and developed a clinic service which brought medical service to all corners of West Virginia. He developed his state Association to its present high level, with affiliates in more than half of the counties of the state. During Mr. Rowell's administration as Executive Secretary of the West Virginia Tuberculosis and Health Association, a number of tuberculosis sanatoria were built throughout the state. He was a tireless worker and he enthused others to become interested in the fight against tuberculosis.

He is survived by his widow, Mrs. Gertrude Hurd Rowell, for many years his able assistant. His daughter, Mrs. Lewis Buesmann, resides in Detroit. West Virginians, interested in the eradication of Tuberculosis will not forget the work of Mr. George C. Rowell.

West Virginia Sanatoria



HOPEMONT SANITARIUM

HOPEMONT, WEST VIRGINIA

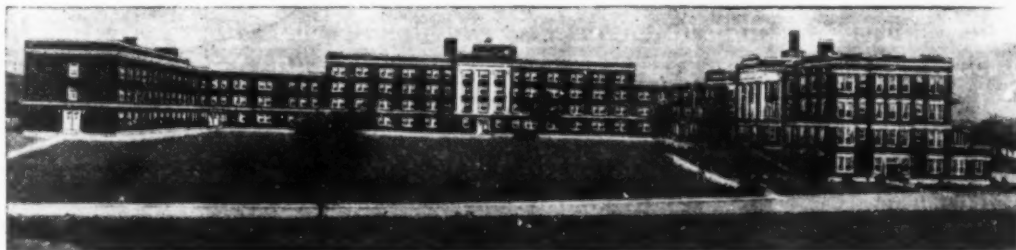
Hopemont Sanitarium is a hospital of 475 beds for the treatment of pulmonary tuberculosis under the management of the Board of Control of the State of West Virginia, and maintained by appropriations of the State Legislature and by collections from patients.

The first unit of Hopemont Sanitarium was constructed in 1913 and was dedicated on June 12, 1913. It was a frame cottage capable of housing 22 patients. Since 1913, eleven units for the care of patients have been added. Also the necessary buildings such as dormitories, houses, laundry, and farm buildings have been constructed.

Patients, who must be residents of the State of West

Virginia, are admitted by application. Because of the difficulty of carrying out complete studies in many parts of the state, patients are admitted for observation and 20 per cent of the admissions are non-tuberculous and run the entire gamut of diseases of the chest.

Hopemont Sanitarium is located at Hopemont, Preston County, West Virginia. It is approved for Residency in Tuberculosis by the Council on Medical Education of the American Medical Association and by the College of Surgeons. Its facilities are used by the Medical School of West Virginia University for teaching purposes.



PINECREST SANITARIUM

BECKLEY, WEST VIRGINIA

Pinecrest Sanitarium was established by a legislative act in 1927 and was completed in 1930. The original unit was constructed to care for approximately 125 adult patients. The purchase of the property on which the sanitarium was built was a gift from the citizens of Beckley and Raleigh County. The first superintendent of the institution was Dr. Geo. Grisinger of Charleston. The present superintendent is Dr. K. M. Jarrell, who took charge of the institution on November 18, 1933.

The need of room for additional patients became so urgent, that the 1937 legislature and the P.W.A. appropriated funds for new buildings. Before this new unit No. 2 was completed there was still more urgent need for additional room to care for the patients and a gift was obtained of \$125,000 from the Department of Public Assistance of this state and was matched by a P.W.A. appropriation from Washington in the amount of approximately \$100,000.

The plans were drawn for this additional building, and construction was started at once. Both of the buildings were completed in 1939 and joined to the

original building and exist in the shape of a quadrangle with a large open space in the lawn. The total cost of the sanitarium with the additional buildings exceeds \$1,000,000.

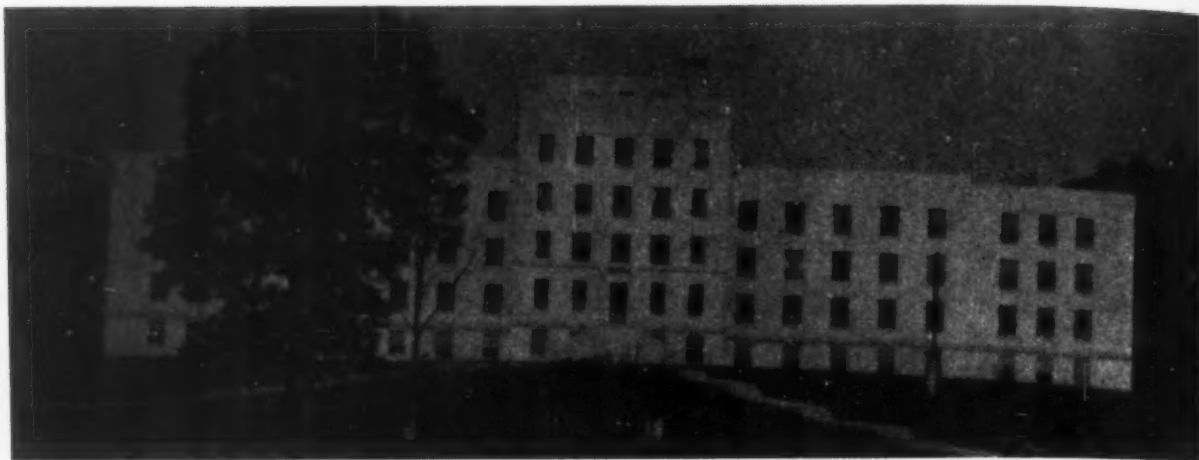
The additional buildings provided beds for approximately 465 patients, and at the present time we have in the institution 465 patients, and a small waiting list still exists.

The appropriation for 1939 to 1941 was \$321,360 to be used in running the institution. The charge to the patients is \$1.00 per day, payable thirty days in advance. It costs approximately \$2.10 per day to take care of each and every patient.

At the present writing there is a new appropriation to build thirty-six additional rooms to the Nurses' Home which will house seventy-two nurses and other female help.

With a waiting list at the present time, it is expected that it will be necessary to construct in the very near future an addition to the present institution for additional patients.

West Virginia Sanatoria



DENMAR SANATORIUM

DENMAR, WEST VIRGINIA

The Denmark Sanatorium of today far surpasses the institution made possible by an act of the 1917 West Virginia Legislature. In 1919 the doors of the State Colored Tuberculosis Sanitarium, as it was then known, were opened to receive for treatment its Negro citizens suffering with tuberculosis. Today, with its improvements and modern equipment and well trained personnel, it brings to an actual realization the hopes and aims of those who helped to set up this institution some 20 years ago. Located on one of the ranges of the Alleghany Mountains in Pocahontas County with an elevation of more than two thousand feet above sea level, away from the ever present coal dust that is evident in many sections of the State, away from the bustle and ado of the busy cities, overlooking

the picturesque Greenbrier River, noted throughout the State for its wonderful fishing holes, then too, in the fall and winter deer can be seen on the river bank seeking water, stands a massive concrete fire-proof building with modern equipment.

On September 1, 1940 the patient population stood at 120 with many applications on file. Due to the progress being made by medical science in the treatment of tuberculosis and the interest displayed by the staff of well trained doctors in using the approved methods of treatment as advanced by medical science, much progress is being made in helping to check this dreaded disease. At the present time a Pathological Laboratory is being equipped so that further research work can be done.



EASTMONT SANATORIUM

MORGANTOWN, WEST VIRGINIA

Located three miles from Morgantown, seat of West Virginia University, is EASTMONT SANATORIUM. It is charmingly situated on a hill in a beautiful private park near Cheat Mountains. It was established in 1926 by the

Monongalia County Tuberculosis Association, and has a capacity of thirty-five beds. Mrs. Susan Cook, R.N., is the Superintendent and Dr. G. R. Maxwell is Chief of Staff.

West Virginia Sanatoria



THE KANAWHA ANTI-TUBERCULOSIS LEAGUE AND HILL CREST SANATORIUM CHARLESTON, WEST VIRGINIA

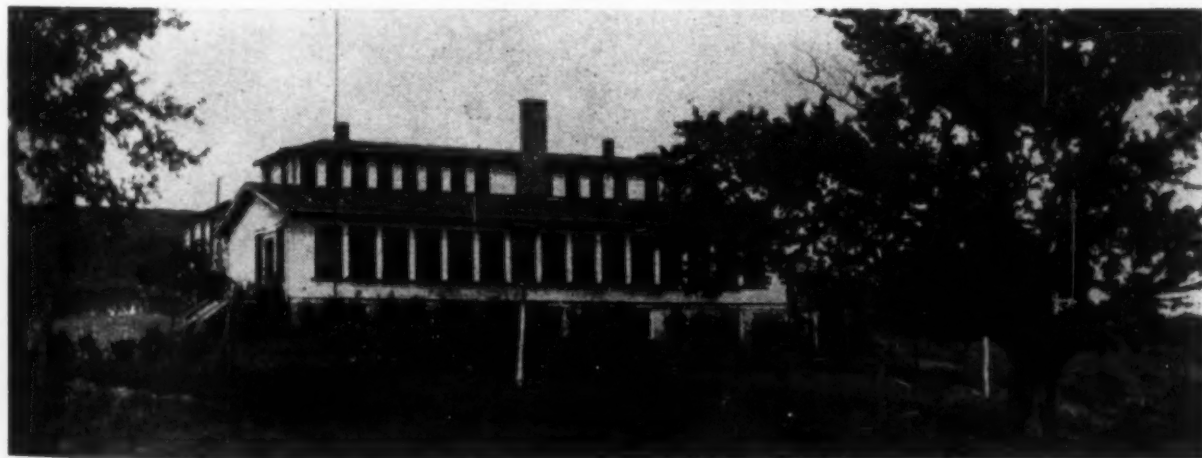
Three years after anti-tuberculosis work was started in Kanawha County, a summer camp for underprivileged children was opened on the ground where Hill Crest Sanatorium now stands. This was in 1911 and it was not until the following winter that the Charter for the Kanawha County Anti-Tuberculosis League was formally issued. For thirty years the care of tuberculous children and children from homes in which there are open cases of tuberculosis has been one of the first interests of the League.

From the first summer camp, the sanatorium grew slowly until, today, Hill Crest is equipped to take care of forty children. There are three permanent brick buildings located on a thirty-five acre tract on a mountain overlooking the beautiful Kanawha River, and plans are developing for replacing the last re-

maining frame building with a twenty-six bed boy's dormitory.

After the first world war, soldiers were sent to Hill Crest for treatment, and, from 1919 until 1930, both adults and children were admitted. When the State of West Virginia opened a new tuberculosis hospital at Beckley, Hill Crest was again limited to children.

The Kanawha County Anti-Tuberculosis League for several years has brought a portable x-ray unit into the county, and during the last year over a thousand x-rays were made especially among children of high school age. Several of the cases discovered by these x-rays are now at Hill Crest. Through Dr. Leo Mynes, the county physician, children are regularly tuberculin tested. Dr. W. L. Cooke is the Medical Director.



MARSHALL COUNTY SANATORIUM MOUNDSVILLE, WEST VIRGINIA

Following a survey of health conditions in Marshall County, conducted by their Tuberculosis Association, the County Court became cognizant of the dire need of a sanatorium for their unfortunate ones who were afflicted with the great white plague. In 1924, funds were appropriated by the County Court for the building and maintenance of a twelve bed sanatorium.

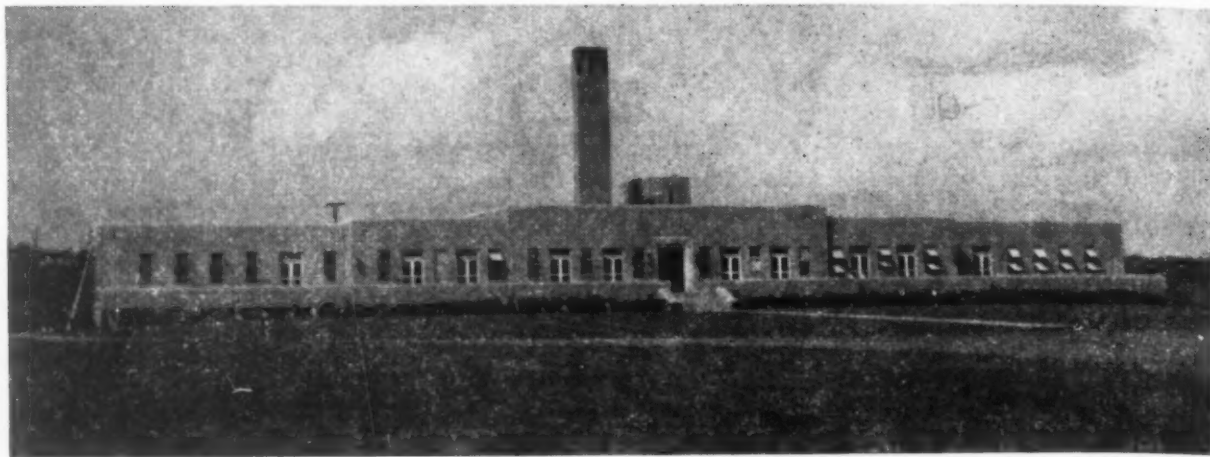
To assure quiet surroundings, the site selected was on the crest of a hill overlooking the City of Moundsville, West Virginia. This institution was not long functioning until the demands for treatment neces-

sitated an addition to the original structure, thus providing facilities for the care and treatment of thirty-two patients, its present capacity.

Residents of this county receive first consideration. However, other applicants are at times admitted by payment of a nominal fee either by the patient or by the County Court in which the patient resides.

X-ray equipment has recently been installed in this institution. Dr. Charles G. Morgan is the Medical Director.

West Virginia Sanatoria



OHIO COUNTY SANATORIUM RONEY'S POINT, WEST VIRGINIA

Commanding a picturesque view of the hills of West Virginia, Ohio County Sanatorium is beautifully located on the hill top of the spacious four hundred acre County Farm, about ten miles distant from the City of Wheeling.

This haven for those afflicted with tuberculosis owes its origin to both the Ohio County Anti-Tuberculosis League and the Board of Commissioners, who in 1928 became keenly interested in establishing a worthwhile and satisfactory tuberculosis program. In that year, the first sanatorium was erected—a frame building with a capacity of sixteen beds. However, the number of patients seeking admission to this institution so far exceeded the accommodations that adequate expansion was necessary. As a consequence, on December 31, 1934, the pioneers of the Anti-Tuberculosis

League again met with the Board of Commissioners and discussed ways and means of erecting a fully-equipped sanatorium that would accommodate about forty patients. Aid was sought from the Federal Emergency Administrator, who not only approved the proposed project for the construction and equipment of our present sanatorium, but agreed to pay about 30 per cent of the cost or approximately \$46,000.00. On September 17, 1936, this very modern fire-proof structure was dedicated—a sanatorium which represents an accumulation of the best that is known to medical science for the control of tuberculosis. Our institution, as the name implies, is restricted to patients of Ohio County and is owned and operated by the County. Dr. E. E. Clovis is the Superintendent.



WAYSIDE FARM PREVENTORIUM PARKERSBURG, WEST VIRGINIA

Wayside Farm Preventorium is located near Parkersburg in Wood County. It is now in its eighth year of service as a year-round program carried on under the auspices of the Wood County Tuberculosis League. The initial cost was approximately \$15,000. The upkeep has been shared jointly with the community, county and state. From its inception in 1924 as a summer camp, to the present time, more than one thousand children ranging in age from one to twelve years have benefitted by a period of treatment. All children are given the Mantoux test before admittance and x-rays are made when indicated.

The preventorium has furnished the means by which the contact was broken between the person ill with tuberculosis and the child; also it gives the child the advantage of a well-regulated regimen of care. Wayside Farm provided such protection when beds were not available within the state for the tuberculous sick.

Results have been gratifying to the community, yet we look forward to the time when the state may have a bed for every case of tuberculosis and when no child shall be deprived of a normal family life. Dr. E. T. Goff is the Medical Director.

Diagnosis of Intestinal Tuberculosis

DAVID SALKIN, M.D., and A. V. CADDEN, M.D., F.A.C.C.P.

Hopemont, West Virginia

Intestinal tuberculosis occurs as an ulcerative lesion complicating pulmonary tuberculosis, as a hypertrophic mass, and as a miliary form associated with tuberculous peritonitis. The ulcerative lesion is the most common of the three varieties and its diagnosis can be made with a high degree of accuracy. The chief method of diagnosis is roentgenological and its development has been due chiefly to the work of Pirie, Stierlin, Brown and Sampson. The taking of a careful history is of next importance. The clinician must be familiar with the natural history of the various dyspepsias to evaluate properly the symptoms present. Laboratory findings are usually of little aid in diagnosis.

Ulcerative intestinal tuberculosis is always a complication of pulmonary tuberculosis and often shows an activity parallel to that of the parent lesion. However, it frequently runs an independent course and may cause severe symptoms or death after the pulmonary lesions have become inactive. A study of over 300 cases shows a similar incidence in males and females. All ages are represented and the older patients have an incidence similar to younger patients, but the older the enteritis the less distressing are the symptoms. At Hopemont Sanitarium, the autopsy incidence of enteritis is 70 per cent. Clinically, however, it occurs in 15 to 20 per cent of the sanatorium population, where a great majority show far-advanced disease in the lungs. In a tuberculosis sanatorium the non-tuberculous dyspepsias are about four times more frequent than those due to tuberculous enteritis. In this series, only 1 per cent of the cases occurred in association with minimal pulmonary disease; 9 per cent occurred with moderately advanced disease; and 90 per cent with far-advanced disease. The exudative pulmonary lesion was associated with 25 per cent of the enteritis cases, and the chronic form with the remaining 75 per cent. Pulmonary cavitation was present in 94 per cent of the cases at the time of onset of bowel symptoms; cavitation had been present in 4 per cent prior to the onset of symptoms; no cavity was found

in 2 per cent of the cases whose diagnosis was made by laparotomy or autopsy. The sputum was positive for tubercle bacilli in 97 per cent at the time of onset of the symptoms.

Intestinal tuberculosis may be present without symptoms. Ten per cent of the enteritis found at autopsy showed no digestive disturbances during life. Enteritis may be present long before symptoms appear and may be started clinically by a pulmonary spread, pleural effusion or an operation. The reason for such variability, we believe, is due mainly to a local neuromuscular irritability plus an afferent-parasympathetic efferent reflex to the involved segment. We feel that this neurogenic view best explains the clinical onset of enteritis, its severity, symptomatology, duration and response to treatment.

The onset of symptoms was sudden in 67 per cent and gradual in 33 per cent. The rapid onset often dates back to some food or laxative or surgical intervention. Although collapse therapy benefits greatly about 40 per cent of all cases of intestinal tuberculosis, yet some cases date their onset to some form of collapse therapy and other cases show an aggravation of symptoms by these procedures.

The symptoms of enteritis may be many or few, mild or severe, local or general. Systemic symptoms may include nervousness, insomnia, chills, fever and failure to gain weight. The digestive symptoms occur in the following order: Anorexia, 85 per cent; crampy pain, 80 per cent; nausea, 70 per cent; diarrhea, 65 per cent; flatulence, 50 per cent; vomiting, 45 per cent; epigastric distress or pain, 30 per cent; constipation, 20 per cent; pyrosis, 20 per cent; tender right lower quadrant, 10 per cent; acid regurgitation, 10 per cent; constipation alternating with diarrhea, 10 per cent; gross blood in stool, 6 per cent; appendicitis, 4 per cent; allergic phenomena in 2 per cent.

Diarrhea and pain occur in two-thirds of all cases and should one wait for these symptoms to appear many early cases will be missed. In this group we include also the cases

who show only a change in the character of the stool from a normal to a soft consistency and without increase in the daily number; these form about 10 per cent of the diarrhea group. Pain and diarrhea occur in some cases that show no enteritis at autopsy; these are regarded as being due to a tuberculotoxemia. Occasionally, pelvic disease and more rarely cholecystitis will produce diarrhea for varying periods of time.

A common triad of symptoms occurring in 12 per cent of the cases includes constipation, crampy pain and pain in the right lower quadrant. Anorexia may be due to the general tuberculous toxemia or a disturbed intestinal gradient. In our studies, about 80 per cent of the anorexias occurring with enteritis are due to a disturbed gradient, and correction of the gradient often produces a good appetite and hunger sensation in the face of a hopeless pulmonary lesion with severe toxemia and high fever. Gross blood in the stool is of uncommon occurrence in enteritis and is of severe prognostic significance. Unusual symptoms frequently occur. One case had recurring attacks of chills, fever, leucocytosis. X-ray examination showed an enteritis and therapy cleared the symptoms immediately. Several cases showed allergic reactions of hives, diarrhea and abdominal distress upon ingestion of raw milk and fruits; correction of the intestinal gradient caused an immediate disappearance of these symptoms. Some cases presented typical attacks of appendicitis, but were proved to be enteritis. Two cases showed only a foul putrid odor of the stools.

Tuberculosis of the ileocecal area may show symptoms usually associated with the function of the esophagus, stomach and upper jejunum. For that reason, we have divided the symptoms into the divisions, gastric and intestinal. The gastric symptoms include acid regurgitation, pyrosis, nausea, vomiting, epigastric distress, and upper abdominal flatulence. The intestinal symptoms include crampy pain, diarrhea, and lower abdominal distension, constipation and blood in the stool. The intestinal symptoms are produced locally and the gastric are referred and due to a deranged gradient elsewhere in the digestive tract. Most cases show both groups of symptoms. However, in four per cent, only gastric

symptoms were present and in eight per cent, only intestinal. In four per cent, the gastric symptoms were mild and in six per cent the intestinal symptoms were minimal. Six per cent of the cases showed normal stool studies with no previous diarrhea, constipation or both.

Physical examination of the abdomen is usually negative. Frequently some tenderness may be present in the right lower quadrant or over the course of the colon, but the signs are not pathognomonic of enteritis. In extensive cases the sigmoidoscope may be used for direct visualization of the ulcers.

Laboratory studies include chiefly the examination of the stool for blood and tubercle bacilli, gastric analyses and coprologic studies. When there is gross blood present in the stool one must rule out hemorrhoids, fissures, fistulae and hemoptysis. The benzedrine reaction is of little value in the diagnosis of enteritis. Prior to the test, the patient should be on a meat-free diet for at least three days and if positive one must rule out gingivitis, swallowing of blood-streaked sputum and postnasal discharge. During sleep these discharges, as well as bloody sputum, are often swallowed. The presence of the specific organism in the stool is of no value for it may be found in the feces of all cases of open pulmonary lesions without any enteritis. Again, many children who do not expectorate and adults with a low-grade cough reflex may show the organism in the stool with no apparent expectoration. When the acid-fast organisms are found in the stool it is further necessary to use cultures and guinea pigs to rule out other acid-fast organisms which are not pathogenic and are frequently present. Many cases of advanced pulmonary disease show abnormal gastric acidity curves and hypoacidity and improper digestion of fats and proteins, but none of these is pathognomonic for enteritis. Blood studies usually show no changes. A leucocytosis associated with pain in the right lower quadrant may mean appendiceal involvement which may be tuberculous or non-specific.

The most accurate method of diagnosis is roentgenologic. One may give barium orally or by enema. Both are frequently used, but in our hands the oral route has proved to be about seven times more diagnostic than the

enema. A modified Brown-Sampson technique is used and observations are made at six, nine, twelve and thirty hour intervals. The double meal may be used six hours apart. Each case is fluoroscoped at every interval and plates are made. The enema does not often give a positive diagnosis when the oral route is negative, but it should be used in puzzling cases. The reasons for this discrepancy between meal and enema are due to the fact that the enema is an abnormal load for the colon and finer grades of irritability are missed by the sheer weight of the solution; that the enema must be retained for at least 5 to 15 minutes prior to taking plates; that the meal gives a better insight to the physiologic disturbances present. We have gained no special information from the use of the double contrast air-barium enema in the study of this disease.

The roentgenology of ulcerative enteritis is predominantly that of the terminal ileum, appendix, cecum and colon. Although unusual emptying of the small gut or prolonged filling of a segment may point to enteritis of the small bowel, yet in the great number of cases the diagnosis is conjectural. However, the small bowel is almost always associated with involvement of the cecum or colon, which lend themselves easily to x-ray observation.

In a follow-up study of our cases we have begun to regard all pathological ulcerative enteritis to be productive of symptoms in 90 per cent of cases and to be asymptomatic in 10 per cent. Of the symptomatic group, about 85 per cent produce definite x-ray changes and 15 per cent do not. Thus, in a given series of pathological enteritis, one may find positive x-ray findings in 78 per cent with and without symptoms, and negative x-ray findings in 22 per cent with and without symptoms. We have found in our series that a positive x-ray diagnosis means enteritis in over 95 per cent of cases. However, a negative diagnosis in the face of highly suspicious symptoms is only 30 per cent reliable, and a suspicious x-ray diagnosis after two examinations is less than 50 per cent reliable. It is thus seen that the greatest value of the x-ray lies in the finding of positive roentgenologic signs and this result may be obtained in about 80 per cent of all cases of enteritis.

The criteria for a positive x-ray diagnosis

are anatomic and physiologic. Actual demonstration of the ulcers is technically difficult and can be made in only very few cases. The physiologic features include those produced locally at the ulcer-bearing area and contributory factors. The local signs include a failure of the involved area to fill or fill well, resulting in a "spastic filling defect," increased irritability, spasm and rapid emptying. Contributory signs include a generalized hypermotility, rapid emptying of the entire bowel, ileal stasis and gastric retention.

Cases presenting suspicious symptoms over a long period of time may show only a dilated, atonic cecum, which may present a typical spastic picture at a later examination. Such cases should be regarded as quiescent rather than healed, for pneumoperitoneum may change a deformed cecum to a dilated one in the course of a few days.

Suspicious roentgenologic cases are often cleared up by a diagnostic pneumoperitoneum. One or two inflations, in a case presenting suspicious symptoms and suspicious roentgenology often makes the diagnosis. If such a case is not due to enteritis no change occurs, but if due to enteritis the symptoms are quickly minimized and the x-ray picture changes completely and assumes normal aspects.

Differential Diagnosis: Ulcerative enteritis may simulate peptic ulcer, gall-bladder disease, or any other disease of the digestive tract. On the other hand, pelvic disease, renal disease, the neuroses, pleural effusion, dyspepsias and postphrenicotomy dyspepsias may simulate enteritis and must be taken into consideration in the diagnosis. X-ray studies can rule out the neuroses, malignancy, mucous and spastic colitis, hyperthyroidism, allergic dyspepsias and pleural effusion. Amoebic dysentery must be ruled out by stool studies. Non-specific colitis may resemble the tuberculous form, but usually occurs in the distal colon. Whenever appendicitis is suspected in a case of pulmonary tuberculosis always rule out enteritis. Very rarely does appendicitis produce localized spastic defects in the cecum or colon and when one has tenderness in the right lower quadrant, with or without leucocytosis and with a normal roentgenologic cecum, one may diagnose appendicitis. Abdominal adhesions may sim-

ulate the tuberculous picture and their diagnosis depends usually upon a careful history and, if necessary, laparotomy.*

Summary

Ulcerative intestinal tuberculosis is always a complication of pulmonary disease occurring usually in far-advanced cases with cavity and positive sputum. Although most cases show a classical symptomatology, yet many other diseases resemble it and no one group of symptoms is pathognomonic. Laboratory aids and physical examination are of little help in diagnosis. The x-ray is, at the present time, our best means of diagnosis, and positive x-ray findings may be obtained in 80 per cent

* *Editor's note:* Abdominal adhesions may very often be demonstrated by x-ray after pneumoperitoneum is established.

of all cases of enteritis. A positive diagnosis is correct in over 95 per cent of cases; a negative one with highly suggestive symptoms is only 30 per cent reliable, and a suspicious one is less than 50 per cent reliable. The diagnosis in suspicious x-ray cases may be cleared up with diagnostic pneumoperitoneum. A group of about 20 per cent of enteritis cases presents normal x-ray findings and in these a careful history and therapeutic pneumoperitoneum will usually clear up the diagnosis.

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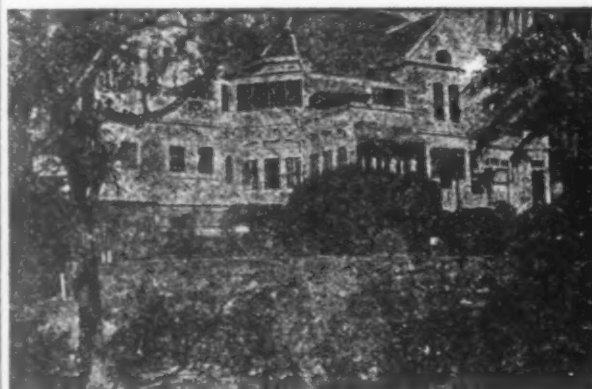
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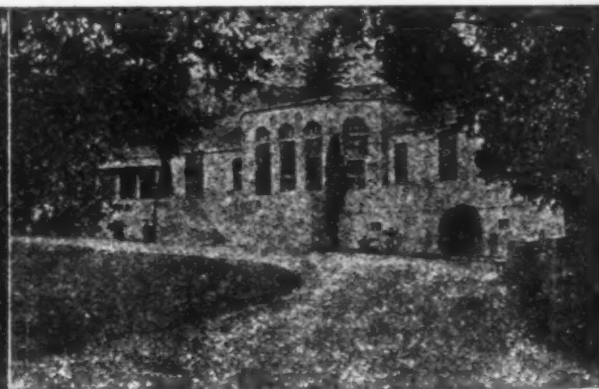
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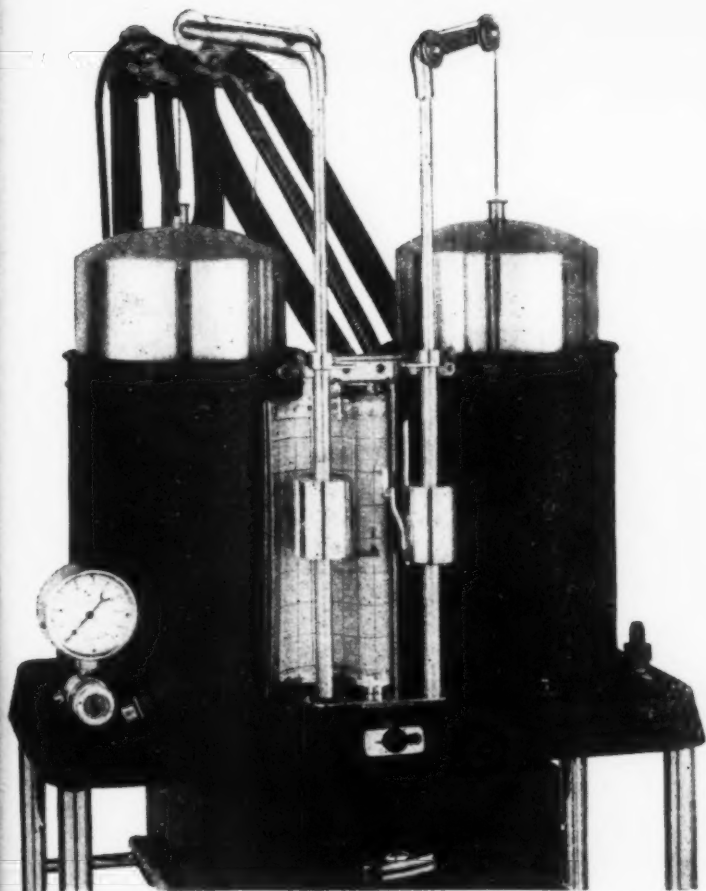
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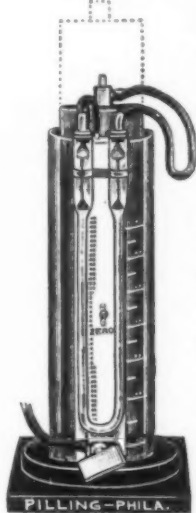
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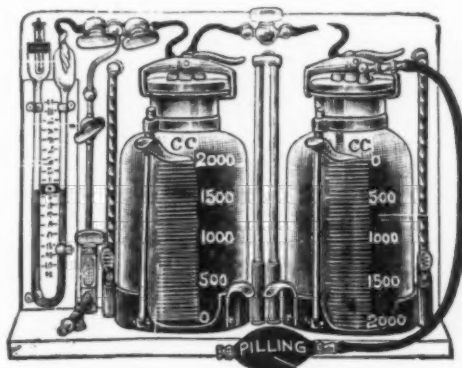
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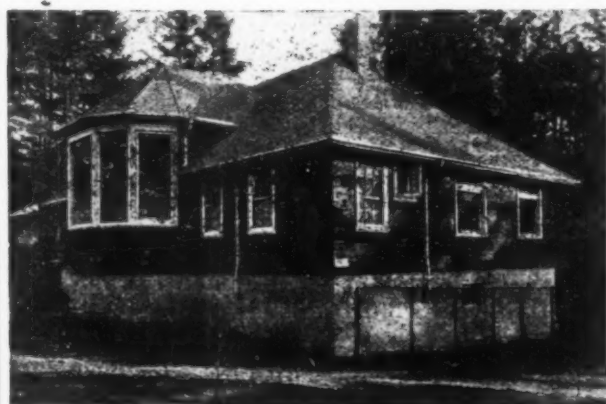
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